Instruments

THE MAGAZINE OF
Measurement and Control

Vol. 12
JAN.
1939
No. 1

SPECIAL ISSUE : : : : IN TWO PARTS

PART TWO

THE 1939 *Instruments* INDEX

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SPECIAL ISSUE OF

Vol. 12, No. 1
January, 1939
Price $2.00
In Two Parts

Instruments THE MAGAZINE OF MEASUREMENT and CONTROL

PART TWO—

THE 1939 INSTRUMENTS INDEX

More Than a Directory

CONTAINING the answers to 99% of the inquiries which *Instruments* receives from subscribers, this Supplement may be likened to a set of phonograph records: it can only be "played" by a "pick-up" The simple "pick-up," which will place at your instant command a wealth of information, is merely your getting acquainted with this Supplement by reading this page. Therefore, it will amply repay you to do so now.

The Index Section "who makes what"—is the most important. Anyone who wants to know where he can buy or secure information on a certain product can turn to this section, find the product properly indexed and cross-indexed, and see under it the names of the manufacturers and sole representatives. The names under each heading are those of the firms claiming to be the manufacturers (or the sole representatives) of those items.

Indexing System. Products are indexed under the main word. In cases where a name is ambiguous, or where the item is known equally well under two or more names, companies making such devices are listed under one subject and cross-references inserted under the other headings.

Specific Terms. You never are in need of "a gage" but of some particular kind of gage. Therefore we do not list manufacturers under broad general designations. For example, we do not list any names under the main heading "Meters" but we give the sources of supply for numerous classes and types of meters. You will find frequency meters under "F," liquid meters under "L," etc. Moreover, we do not list any names under "Liquid Meters" alone, but we give under proper sub-heads the sources of supply for whatever *class* and *type* of liquid meter you need.

Trade Names. An effort has been made to remove all proprietary trade names from the Index Section.

Correctness of Designations. We have endeavored to list no firm names under specific main headings unless the instruments made by such firms belong there by virtue of their design and construction.

For example, an instrument for measuring Humidity (which is the water-vapor content of air and gases) does not belong under Moisture which is a term reserved for the liquid-water content, and vice-versa.

Also a Colorimeter is an instrument for quantitatively measuring the chromaticity of a specimen by determining spectral distribution of transmitted or reflected luminous energy, and instruments called "colorimeters" which cannot yield color specifications belong under Color Comparators, Color Matchers, etc.

The same applied to sub-heads. Examples:

(a) An instrument called the "_____ Recorder" which does not produce a permanent graphic record on a chart or tape or film, is not a recorder, it may possibly be a "maximum-registering" or other type different from the ordinary indicating type.

(b) An instrument called the "Integrating _____" or "Totalizing _____" may be nothing but a counting type, belonging under the sub-head "Counting."

Completeness. More than 1000 manufacturers were canvassed by The Instruments Publishing Company in the last four months. Those that did not fill in our first questionnaire after one month received a second one. Again, a third questionnaire was sent to non-responders at the end of the second month. In the last few weeks we even sent representatives to call on manufacturers, urging them to check every listed item they made. Therefore, the omission of any manufacturer's name under any heading is due to the negligence of someone in his own organization.

Every effort has been made to restrict the names in the Index Section to (1) the actual manufacturers and (2) the sole authorized sales agencies of manufacturers who do not or cannot conveniently sell directly to you. On the other hand, whenever you desire to order at one time a variety of equipment, made by numerous firms, you may find it most convenient to get in touch with a recognized, competent, "laboratory supply house." These houses are listed under "Apparatus, Laboratory," on page 4.

Instruments' Further Service. This Index contains the answers to *only* 99% of your inquiries. If you cannot find the product or the name you want, don't hesitate to communicate with the Information Section, Instruments Publishing Co., 1117 Wolfendale St., Pittsburgh, and every effort will be made to furnish the information promptly.

Suggestions. We shall appreciate suggestions regarding:

1. Headings not at present found in this Index which should be there,
2. Firms listed erroneously, and
3. Other inaccuracies which may have crept in despite all precautions.

CONTENTS

1. Index to Instruments and Apparatus. In this section, products are listed alphabetically. Under each heading appear the names of the manufacturers of this equipment (and of the sole representatives of such manufacturers). *Pages 2-53:*

A	2	G	17	M	25	S	40
B	4	H	23	N	28	T	42
C	7	I	24	O	28	U	50
D	14	J	24	P	32	V	50
E	15	K	24	Q	35	W	53
F	15	L	24	R	35	X	53

2. Directory of Laboratory Supply Houses. Under the heading "Apparatus, Laboratory," on page 4, are listed companies specializing in laboratory supplies, equipment, instruments and apparatus.

3. Directory of Manufacturers and sole representatives, with complete addresses. *Pages 54-58.*

4. Instrument's Book Shelf. Pages 59-60.

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R. RIMBACH, Managing Editor

M. F. BEHAR, Editor

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INDEX Section

ABRASION MACHINES
(See Testers, Abrasion)

ABSOLUTE PRESSURE INDICATORS (See Gages, Absolute Pressure)

ACCELEROMETERS
Alpha Instrument Co.
American Askania Corp.
Brush Development Co.
Cambridge Inst. Co.
Commercial Eng. Labs.
Cramer & Co., Inc.
General Elec. Co.
Kollsman Inst. Co.
Pioneer Inst. Co.
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ACIDIMETERS
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Hersey Co.
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Ruehfel Co.
Schultheis Corp.
Tagliabue Mfg. Co.
Uehling Instrument Co.

ACOUSTIMETERS (See Sound Level Meters)

AEROGRAPHS
Fuess, Inc.

AEROMETERS
Friez & Sons

AIR ANALYSIS APPARATUS (See Gas Analyzers, Air)

AIRCRAFT NAVIGATIONAL INSTRUMENTS
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Consol. Ashcroft-Hancock
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General Elec. Co.
Gurley, W. & L. E.
Hickok Elec. Inst. Co.
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Kollsman Inst. Co.
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Pioneer Instrument Co.
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Pioneer Instrument Co.
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U. S. Gauge Co.
Weston Elec. Inst Corp.
Lewis Engg. Co.
Roller-Smith Co.
Westinghouse Elec. & Mfg.

AIR DISTANCE, Indicators & Recorders
Jaeger Watch Co.

AIR FLOW METERS (See Flowmeters, Air)

AIR METERS (See Gas Meters, Positive)

AIRSPEED INDICATORS (See also Aircraft)
American Askania Corp.
Fuess, Inc.
Illinois Testing Labs.
Jaeger Watch Co.
Kollsman Inst. Co.
Pioneer Instrument Co.
U. S. Gauge Co.
Zeitnickow Co.

AIRSPEED INDICATOR TESTERS
Amthor Test. Inst. Co.
Jaeger Watch Co.
Pioneer Instrument Co.

ALARMS, Carbon Bisulphide
Bushnell, R. O.

ALARMS, Carbon Monoxide Mine Safety Appliances

ALARMS, Combustible Gas
Mine Safety App. Co.

ALARMS, High, low water
Yarnall-Waring Co.

ALARMS, Hydrogen Sulphide
Southwestern Elec. Labs.

ALARMS, SMOKE (See Smoke Density Indicators)

ALIDADES (See Surveying Instruments)

ALKALIMETERS
Ace Glass Inc.
Central Scientific Co.
Eimer & Amend
Fisher Scientific Co.
General Elec. Co.
Heltige, Inc.
Kimble Glass Co.
Rubicon Co.
Ruehfel Co.
Schultheis Corp.
Specialty Glass Co.
Tagliabue Mfg. Co.

ALTIMETERS (See Barometers, Altitude)

ALTIMETER TESTERS
Amthor Test. Inst. Co.
Fuess, Inc.
Kollsman Inst. Co.
Pioneer Instrument Co.

ALTITUDE BAROMETERS (See Barometers, Altitude)

AMMETERS, Indicating
Burton Rogers Co.
Cambridge Inst. Co.
Columbia Elec. Mfg.
De Jur-Amsco Corp.
Engelhard, Chas.
Ferranti Electric, Inc.
General Elec. Co.
Hickok Elec. Inst. Co.
King Seeley Corp.
Lundquist Tool & Mfg.
Niagara Electrical Inst.
Norton Electrical Inst.
Precision Apparatus Corp.
Radio City Products Co.
Rawson Elec. Inst. Co.
Reliance Instrument Co.
Rochester Mfg. Co.
Roller-Smith Co.
Sensitive Research Inst.
Simpson Electric Co.
Triplett Electrical Inst.
Welch Mfg. Co.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.
Wheelco Inst. Co.

AMMETERS, Milliammeters
Allen Elec. & Equip. Co.
Bernard, H. J.
Bristol Co.

AMMETERS, Milliammeters (Cont'd)
Burton Rogers Co.
Cambridge Inst. Co.
Clough-Brengle Co.
De Jur-Amsco Corp.
Engelhard, Chas.
Esterline-Angus Co.
Etna Elec. Works
General Elec. Co.

AMMETERS, Milliammeters (Cont'd)
Hickok Elec. Inst. C
Lundquist Tool & M
Norton Electrical In
Precision Apparatus
Radio City Product
Rawson Elec. Inst.
RCA Manufacturing
Roller-Smith Co.
Sensitive Research In
Simpson Elec. Co.
Supreme Inst. Corp.
Tagliabue Mfg. Co.
Triplett Electrical Inst
Welch Mfg. Co.
Westinghouse Elec. & M
Weston Elec. Inst. Co
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OIL PRESSURE GAGES
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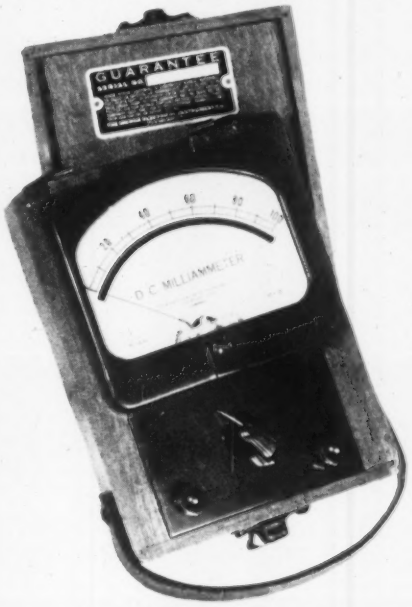

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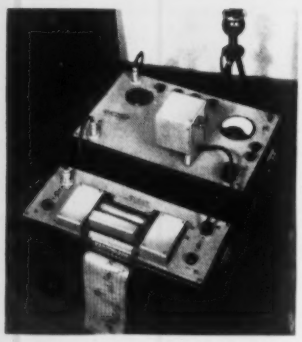

Ten years' practical consulting experience in acoustic, noise and vibration control, backed by the unparalleled experience of Bell Telephone Laboratories in the design of acoustic systems, qualifies us to offer unusually reliable and practical acoustic testing instruments.

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Sound Level Meters
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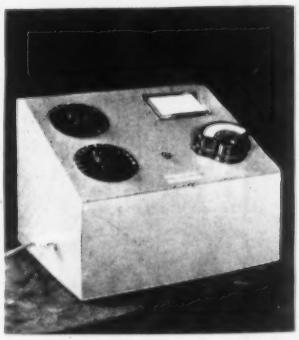
The RA-281 Recording Frequency Analyzer is the first complete, practical acoustic testing equipment for the development laboratory, providing for overall noise measurements and continuous analysis, either by meter indication or automatically recorded graphic record.



The RA-248 Industrial Noise Analyzer is essentially a rugged AC operated sound meter with all the filters required for routine production testing. Controls have been simplified for operation by factory personnel.

For addresses, see pages 52-58

Announcing a New MACBETH

AIR-COOLED Color-Matching SKYLIGHT

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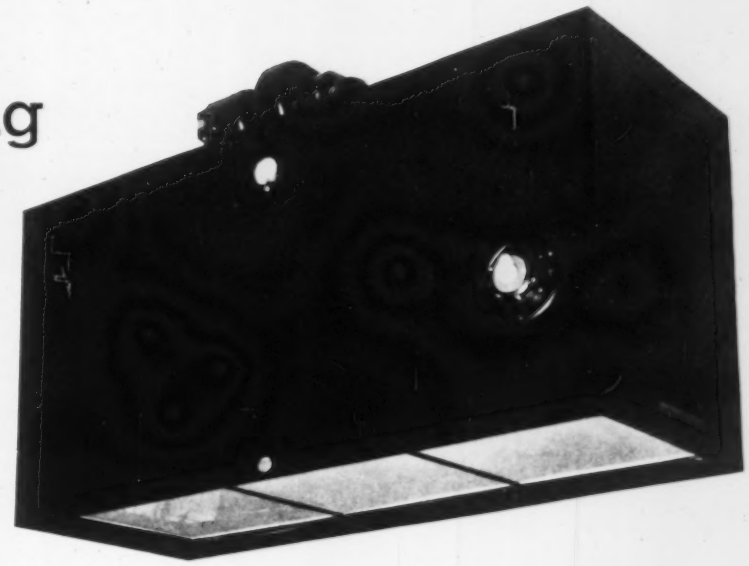

Macbeth Model BKX83 providing softly diffused daylight and horizon-sunlight.

FOR years, colorists' standard daylight was the natural north-sky window. Recent lighting developments have enabled Macbeth engineers to design a skylight reproducing every quality of ideal natural daylight.

The BKX83 delivers a high-intensity north-sky daylight, accomplished by using special filters which are the only ones that have been approved by the American Society of Testing Materials in producing daylight for oil colorimetry and which most closely approximate the daylight quality specified by the National Bureau of Standards.

This new unit produces a large spread of softly diffused daylight, eliminating all glare and objection to an artificial daylight source, besides supplying a constant standard daylight, eliminating the variation at a natural north-sky window.

The new BKX83 is now being used by leading plastic, textile, paper and dyestuff manufacturers and is applicable where any color problem prevails. This model also produces Horizon-sunlight (a magnification of ordinary artificial light). Colors which match under both Daylight and Horizon-sunlight, have been checked against two extremes of spectrum and will match under any lighting condition.

Macbeth also manufactures other types of color matching equipment and small laboratory lamps, producing true daylight values for examination. For less exacting purposes, Macbeth also has a complete line of fluorescent daylight lamps for inspection and seeing problems.

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HD Elec. Co.
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Rubicon Co.
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Weston Elec. Inst. Corp.

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Roller-Smith Co.

AMMETERS, Thermo
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Etna Elec. Works
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Roller-Smith Co.
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United Cinephone Corp.
Thordarson Elec. Co.
Southwestern Elec. Labs.
Triumph Mfg. Co.
United Sound Eng.
United Trans-former Corp.

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AMPLIFIERS, Commercial Frequency
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Luxtrol Co., Inc.
McFarlin Co.
Raytheon Mfg. Co.
Southwestern Elec. Labs.
United Cinephone Corp.
United Trans-former Corp.

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Electronic Design Corp.
Electronic Lab.
General Elec. Co.
General Radio Co.
Luxtrol Co., Inc.
McFarlin Co.
Raytheon Mfg. Co.
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AMPLIFIERS, Radio Frequency
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Raytheon Mfg. Co.
RCA Manufacturing Co.
Remler Co., Ltd.
Southwestern Elec. Labs.
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ANALYZERS, Radio Set
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Clough-Brengle Co.
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Jackson Electrical Inst.
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Doerr Glass Co.
Eastern Scientific Co.
Eberbach & Sons
Eimer & Amend
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Electro-Medical Lab.
Empire Lab. Supply
Erish Co.
Fassett Co., Inc.
Federal Pneumatic Sys.
Ferner Co.
Fish-Schurman Co.
Fisher Scientific Co.
Flood, J. Melvin
Frohec-Faybor Co.
Gaertner Scientific Corp.
General Biological Supply
General Radio Co.
Gerrish-Padgett Corp.
Gibson-Byng Co.
G-M Labs.
Goetze-Nemer Co.

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Griner Co., A. J.
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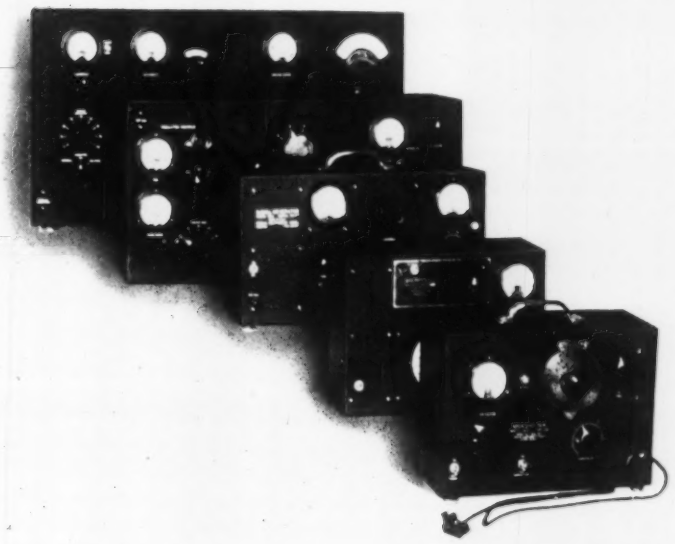

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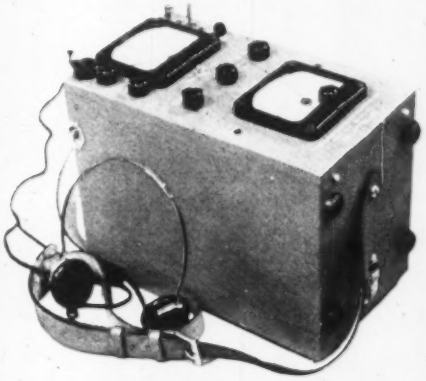

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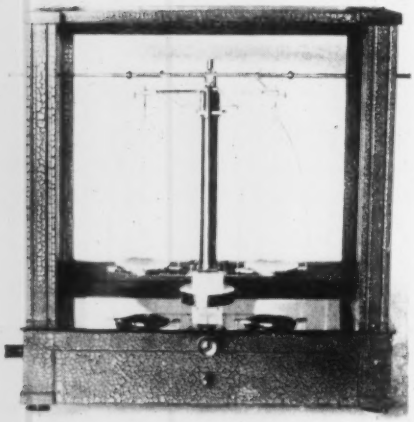

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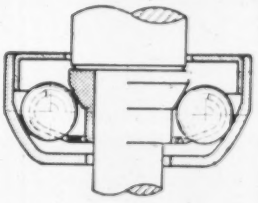

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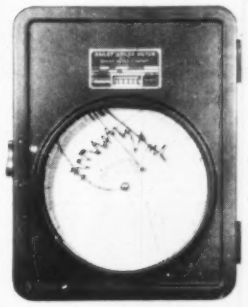

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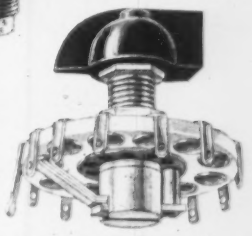

Send for Bulletin 501

SHALLCROSS MFG. CO.
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Switches ● Resistors ● Instruments

For addresses, see pages 54-68

CALORIMETERS, Peroxide Bomb
Parr Instrument Co.

CALORIMETERS, Steam
Ellison Draft Gage Co.
Wallace & Tiernan Prod.

CALIBRATING BEAMS, Holz, Herman A.

CALIPERS, Square
Starrett Co.

CAMERAS, SCIENTIFIC
Bond Associates
Cambridge Inst. Co.
Electro-Medical Lab.
Fecker, J. W.
Hoffman Co., S. O.
Jarrell-Ash Co.
Mine Instrument Co.
Perkin-Elmer & Moffitt
Zeiss, Inc., Carl

CAMERAS, SCIENTIFIC, Back Reflection
Hayes Scientific Apts.

CAMERAS, SCIENTIFIC, Diffraction
American Inst. Co.

CAMERAS, SCIENTIFIC, Motion Picture
Bell & Howell
Eastern Science Co.
Geophysical Inst. Co.

CAMERAS, SCIENTIFIC, Motion Picture X-Ray
American Ashanta Corp.

CAMERAS, SCIENTIFIC, Photo Micro (See Microscopes, Metallographic)

CAPACITANCE METERS
Andrew, Victor J.
Biddle Co., Jas. G.
Cambridge Inst. Co.
Clough Brengle Co.
Electronic Design Corp.
General Elec. Co.
General Radio Co.
Jackson Electrical Inst.
Leeds & Northrup Co.
RCA Mfg. Co., Inc.
Rubicon Co.

CAPACITORS, Air
Andrew, Victor J.
Cambridge Inst. Co.
Cardwell Mfg. Corp.
General Radio Co.
Leeds & Northrup Co.

CAPACITORS, Electrolytic
Aerovox Corp.
Cornell Dubilier
Crowley & Co.
General Elec. Co.
Magnavox Co.
Potter Co.
Tobe Deutschmann Corp.

CAPACITORS, Mica
Cambridge Inst. Co.
Cornell Dubilier
General Elec. Co.
General Radio Co.
Industrial Inst. Inc.
RCA Manufacturing Co.
Leeds & Northrup Co.
Potter Co.
Rubicon Co.
Sangamo Electric Co.
Solar Mfg. Corp.

CAPACITORS, Paper
Cornell Dubilier
Tobe Deutschmann Corp.

CAPACITORS, Precision
Leeds & Northrup Co.

CAPACITORS, Variable
Cambridge Inst. Co.
Cardwell Mfg. Co.
General Radio Co.
Leeds & Northrup Co.
Rubicon Co.

CAPACITY METERS
Andrew, Victor J.
Bernard, H. J.
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Hickok Elec. Inst. Co.
Industrial Inst. Inc.
Leeds & Northrup Co.
Premier Crystal Labs.
Radio City Products Co.
RCA Manufacturing Co.
Rubicon Co.
Solar Mfg. Corp.
Weston Elec. Inst. Corp.

CARBON DIOXIDE METERS (See Gas Analyzers, Carbon Dioxide)

CARBON MONOXIDE METERS (See Gas Analyzers, Carbon Monoxide)

CARBON PILES (See Resistors, Carbon Compression)

CATHETOMETERS
American Ashanta Corp.
Cambridge Inst. Co.
Central Scientific Co.
Fecker, J. W.
Fisher Scientific Co.
Gaertner Scientific Corp.
Mine Instrument Co.

CATHODE RAY TUBES (See Oscillographs, Cathode Ray)

CELLS, Conductivity
Eimer & Amend
Industrial Inst. Inc.
Leeds & Northrup Co.

CELLS, Kerr
Batcher, Ralph R.
General Physical Lab.

CELLS, Photoelectric
Bell Telephone Labs.
Continental Elec. Co.
Du Inc.
Electronic Lab.
Electronic Prod. Co.
General Elec. Co.
General Scientific Corp.
G-M Labs.
Hickok Elec. Inst. Co.
Intercontinental Mfg. Co.
Lammert & Mann Co.
Loewenberg, F.
Lumenite Elec. Co.
Luxtrol Co., Inc.
Pfaltz & Bauer, Inc.
Photobell Corp.
Rhamstine, J. Thos.
RCA Manufacturing Co.
United Cinephone Corp.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

CELLS, Standard
Cambridge Inst. Co.
Eppley Lab.
Leeds & Northrup Co.
Rubicon Co.
Weston Elec. Inst. Corp.

CEMENT APPARATUS (See Testers & Testing Machines, Cement)

CEMENTING GAGES (See Gages, Cementing)

CEMENT MOLDS
Central Scientific Co.
Fisher Scientific Co.
Humboldt Mfg. Co.
Precision Scientific Co.
Standard Concrete Appl.

CEMENT NEEDLE APPARATUS
Fisher Scientific Co.
Humboldt Mfg. Co.

CENTRIFUGES
Clay Adams Co.
Fisher Scientific Co.
Williams Apparatus Co.
Southwestern Elec. Labs.

CENTRIFUGES, Paper Testing
Williams Apparatus Co.

CENTRIFUGES, Oil Testing
Bowser & Co.
Brant Corp.
Central Scientific Co.
Eclipse Aviation
International Equip.
Precision Scientific Co.
Taglabue Mfg. Co.
Thomas Co., Arthur H.
Western Machinery Co.
Westinghouse Elec. & Mfg.

CHAINS, SURVEYOR'S (See Surveying Instruments)

CHECKERS, RADIO TUBE (See Analyzers, Radio Set)

CHEMICAL DENSITY, Indicators
Electronic Prod. Co.
Rubicon Co.
Taglabue Mfg. Co.
United Cinephone Corp.

CHEMICAL DENSITY, Recorders
Esterline Angus Co.
Taglabue Mfg. Co.
United Cinephone Corp.

CHEMICAL DENSITY, Recorder-Controller
Electronic Prod. Co.
Mine & Smelter Sup. Co.
Taglabue Mfg. Co.

CHEMICAL FEEDERS, Automatic pH Control
Electronic Prod. Co.
Everson Mfg. Co.
International Filter Co.
Leeds & Northrup Co.
Sutton Company
Wallace & Tiernan

CHEMICAL FEEDERS, Dry & Liquid
Builders Iron Foundry
Cochrane Corp.
Colloid Equip. Co.
Fischer & Porter
Gump Co., B. F.
International Filter Co.
Jeffrey Mfg. Co.
Mine & Smelter Sup. Co.
Omega Machine Co.
Richardson Scale Co.
Sutton Company
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CHEMICAL PORCELAIN (See Porcelain, Laboratory)

CHLORINE CONTROL APPARATUS (See Controllers, Automatic, Chlorine)

CHLORINE TESTING APPARATUS (See Testers, Chlorine)

CHOKES
Andrew, Victor J.
Amtc Co.
Clough Brengle Co.
Martin Decker Corp.
Ohmite Mfg. Co.
Raytheon Mfg. Co.
Thordarson Elec. Co.
United Transformer Corp.

CHOKES, Precision metering, for flowtests on oilwells
Rieke & Co., Inc.

CHRONOGRAPHS
American Inst. Co.
Aristo Import Co.
Burke, Louis
Cambridge Inst. Co.
Hausmann Co.
Electro-Medical Lab.
Esterline Angus Co.
Fecker, J. W.
Gaertner Scientific Corp.
Jaeger Watch Co.
Jardin Import Co.
Pierce Watch Co.
Precision Photo & Inst.

CHRONOMETERS (See Watches)

CLASSIFIERS, Particle Size, Air
Colloid Equip. Co.
Federal Pneumatic Sys.

CLINOGRAPHS, Bore Hole
Geophysical Inst. Co.
Sperry Sun Well Surveying

CLOCKS, A.c. Electric
Ansonia & York Clock
Brown Inst. Co.
Cincinnati Time Rec. Co.
Cutsel, Ashcroft-Hancock
General Elec. Co.
Hammond Instrument Co.
Howard Clock Products
Lux Clock Mfg. Co.
Middlebury Elec. Clock
Standard Elec. Time
Stromberg Electric Co.
Thomas Clock Co.
Warren Telechron Co.
Zenith Electric Co.

CLOCKS, D.c. Electric
Brown Inst. Co.
Howard Clock Products
Jaeger Watch Co.
Standard Elec. Time
Stromberg Electric Co.
Thomas Clock Co.
Zenith Electric Co.

CLOCKS, Master
Cincinnati Time Rec.
Gaertner Scientific Co.
General Elec. Co.
Howard Clock Prod.
International Bus. Mc.
Paragon Electric Co.
Standard Elec. Time
Stromberg Electric C.
Thomas Clock Co.
Warren Telechron Co.
Zenith Electric Co.

CLOCKS, Minute Impu & Synchronous
Cincinnati Time Rec.
Cramer & Co., Inc.
Elec. Tachometer Corp.
General Elec. Co.
Howard Clock Product
International Bus. Mc.
Paragon Electric Co.
Standard Elec. Time C
Stromberg Electric C.
Thomas Clock Co.
Warren Telechron Co.
Zenith Electric Co.

CLOCKS, Motor-Operated
Ansonia & York Clo
Brown Inst. Co.
Burke, Louis
Cincinnati Time Rec.
General Electric Co.
Howard Clock Produc
International Bus. Mc
Standard Elec. Time
States Co.
Stromberg Electric C
Thomas Clock Co.
Warren Telechron Co.
Zenith Electric Co.

CLOCKS, Primary
Cincinnati Time Rec.
General Elec. Co.
Howard Clock Produc
International Bus. Mc
Stromberg Electric Co.
Thomas Clock Co.

CLOCKS, Secondary
American Automatic Elec
Cincinnati Time Rec. C
General Elec. Co.
Howard Clock Products
International Bus. Mc
Standard Elec. Time
Stromberg Electric Co.
Thomas Clock Co.

CLOCKS, Standard
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Jaeger Watch Co.
Kollsman Inst. Co.
Standard Elec. Time

CLOCKS, Stop
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Fish-Schurman Co.
Glogan & Co.
Jaeger Watch Co.
Paragon Electric Co.
Standard Elec. Time
Taglabue Mfg. Co.
Thompson Clock Co.
Warren Telechron Co.

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Corning Glass Works
Fisher Scientific Co.
Humboldt Mfg. Co.
Rudel Co.
Scientific Inst. Co.
Taglabue Mfg. Co.
Western Machinery Co.

COAL METERS
Bailey Meter Co.
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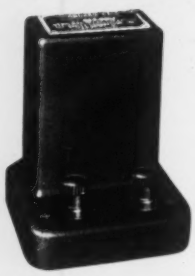

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COIL TESTING EQUIPMENTS (See Testers, Coil)

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Pioneer Instrument Co.
White Co., Inc.

COLOR ANALYZERS, Photoelectric
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Bausch & Lomb Optical
Central Scientific Co.
Eimer & Amend
Electronic Prod. Co.
Ess Inst. Co.
Fisher Scientific Co.
Gaertner Scientific Corp.
General Elec. Co.
General Radio Co.
Hays Laboratories
Klett Mfg. Co.
Luxtrol Co., Inc.
Pfaltz & Bauer, Inc.
Photobell Corp.
Rawson Elec. Inst. Co.
Rubicon Co.
Saxl Instrument Co.
Southwestern Elec. Labs.
United Cinephone Corp.

COLOR COMPARATORS, Photoelectric (See Color Analyzers, Photoelectric)

COLOR COMPARATORS, Visual
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Baird Associates
Barkon Frink
Bausch & Lomb Optical
Central Scientific Co.
Electronic Research Labs.
Fisher Scientific Co.
Gaertner Scientific Corp.
Hays Laboratories
Hellige, Inc.
LaMotte Chemical Prod.
Leitz, Inc.
Luxtrol Co., Inc.
Munsell Color Co.
Rascher & Bezold
Saxl Instrument Co.
Tagliabue Mfg. Co.
Taylor & Co., Inc., W. A.
United Cinephone Corp.
Zeiss, Inc., Carl

COLOR GRADERS. (See Color Analyzers, Photoelectric)

COLOR MATCHING OUTFITS (See Color Comparators, Visual)

COLORIMETER TUBES (See Colorimeters, Visual)

COLORIMETERS, Photoelectric
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Electronic Prod. Co.
Frober-Faybor Co.
General Elec. Co.
Hays Laboratories
Higgins, Charles F.
Klett Mfg. Co.
Luxtrol Co., Inc.
Pfaltz & Bauer, Inc.
Photobell Corp.
Rubicon Co.
Saxl Instrument Co.
Scientific Glass App.
Southwestern Elec. Labs.
United Cinephone Corp.

COLORIMETERS, Visual
Akatos, Inc.
American Inst. Co.
Bausch & Lomb Optical
Central Scientific Co.
Electronic Research Labs.
Fisher Scientific Co.
Klett Mfg. Co.
Leitz, Inc.
Munsell Color Co.
Rascher & Bezold
Saxl Instrument Co.
Spencer Lens Co.
Zeiss, Inc., Carl

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Bailey Meter Co.
Bowser, & Co.
Brown Inst. Co.
Crew Equip. Co.
Dwyer Mfg. Co.
Ess Inst. Co.
Friez & Sons
Hays Corp.
Protectoseal Utilities Mfg.
Republic Flow Meters
Tagliabue Mfg. Co.
Uehling Instrument Co.

COMBUSTION, Recorders
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Bailey Meter Co.
Brown Inst. Co.
Ess Inst. Co.
Hays Corp.
Republic Flow Meters
Tagliabue Mfg. Co.
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COMBUSTION CONTROL EQUIPMENT (See Controllers, Automatic-Combustion)

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Bernard, H. J.
Brush Development Co.
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Daven Co.
Elec. Indicator Co.
General Elec. Co.
Hickok Elec. Inst. Co.
Industrial Inst. Inc.
Leeds & Northrup Co.
RCA Manufacturing Co.
Rubicon Co.
Sensitive Research Inst.
Shalleross Mfg. Co.
Weston Elec. Inst. Corp.

COMPARATORS, Mechanical
Federal Prod. Corp.
Fetter Co.
Mico Instrument Co.
North Side Tool Co.
Scherr Co., Inc.

COMPARATORS, Optical
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Cambridge Inst. Co.
Electronic Research Labs.
Ess Inst. Co.
Jones & Lamson Mach.
Leitz, Inc.
Scherr Co., Inc.
United Cinephone Corp.
Van Keuren Co.
Zeiss, Inc., Carl

COMPASSES, Aircraft
American Askania Corp.
Elgin Nail Watch Co.
Kollsman Inst. Co.
Pioneer Instrument Co.
RCA Manufacturing Co.
Star Compass Co.

COMPASSES, Automobile
Star Compass Co.
U. S. Gauge Co.

COMPASSES, Azimuth
Ainsworth & Sons
Kenffel & Esser Co.
Leupold, Volpel & Co.
Pioneer Instrument Co.
Warren Knight Co.

COMPASSES, Dip
Gurley, W. & L. E.
Kenffel & Esser Co.
Taylor Inst. Cos.
Warren Knight Co.

COMPASSES, Drafting Room (See Drawing Instruments)

COMPASSES, Gyro
Sperry Gyroscope Co.

COMPASSES, Magnetic
Ainsworth & Sons
Baker Compass Co.
Geophysical Inst. Co.
Gurley, W. & J. E.
Kenffel & Esser Co.
Kollsman Inst. Co.
Leupold, Volpel & Co.
Negus, T. S. & J. D.
Pioneer Instrument Co.
Star Compass Co.
Taylor Inst. Cos.
Terrific Instrument Co.
Warren Knight Co.

COMPASSES, Marine
American Askania Corp.
Baker Compass Co.
Bendix Marine Products
Bliss, & Co.
Geophysical Inst. Co.
Marine Compass Co.
Negus, T. S. & J. D.
Star Compass Co.

COMPASSES, Radio
Hickok Elec. Inst. Co.
RCA Manufacturing Co.
Triumph Mfg. Co.

COMPASSES, Ship (See Compasses, Marine)

COMPASSES, Telltale (See Compasses, Marine)

COMPENSATION, Magnetic
Geophysical Inst. Co.

CONCENTRATION RECORDERS
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CONDENSER, Electric (See Capacitors)

CONDENSER LEAKAGE Indicators
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Hickok Elec. Inst. Co.
Industrials Inst. Inc.
Jackson Electrical Inst.
Leeds & Northrup Co.
Potter Co.
Radio City Products Co.
Rawson Elec. Inst. Co.
Tobe Deutschmann Corp.
Triumph Mfg. Co.
Weston Elec. Inst. Corp.

CONDENSER LEAKAGE Recorders
Esterline Angus Co.
Leeds & Northrup

CONDENSERS (OPTICAL), Abbe
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Fuess, Inc.
E. Leitz, Inc.
Perkin Elmer & Model
Pfaltz & Bauer, Inc.
Spencer Lens Co.
Zeiss, Inc., Carl

CONDENSER (OPTICAL), Achromatic
Bausch & Lomb Optical
Central Scientific Co.
Clark & Sons
Fuess, Inc.
General Scientific Corp.
Leitz, Inc., E.
Perkin Elmer & Model
Pfaltz & Bauer, Inc.
Spencer Lens Co.
Zeiss, Inc., Carl

CONDENSER (OPTICAL), Apochromatic
Central Scientific Co.
Leitz, Inc.
Perkin Elmer & Model
Spencer Lens Co.
Zeiss, Inc., Carl

CONDENSER (OPTICAL), Bull's Eye
Bausch & Lomb Optical
Perkin Elmer & Model
Spencer Lens Co.

CONDENSER (OPTICAL), Cardioid
Bausch & Lomb Optical
Perkin Elmer & Model
Pfaltz & Bauer, Inc.
Zeiss, Inc., Carl

CONDENSER (OPTICAL), Glass
Ace Glass, Inc.
Bausch & Lomb Optical
Clark & Sons
Fish-Schurman Co.
Fuess, Inc.
General Scientific Corp.
Gerber Instrument Co.
Master Optical Co.
Perkin Elmer & Model
Rascher & Bezold
Specialty Glass Co.
Spencer Lens Co.

CONDENSER (OPTICAL), Paraboloid
Baird Associates
Bausch & Lomb Optical
Clark & Sons
Fish-Schurman Co.
Fuess, Inc.
Perkin Elmer & Model
Pfaltz & Bauer, Inc.
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Leeds & Northrup Co.
Nat. Alexander Co.
Rubicon Co.
Scientific Research Inst.
Solenoid Mfg. Co.

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Ainsworth Pyrometric Cone
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CONES, Slump
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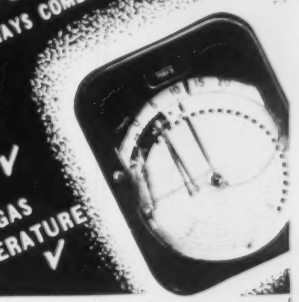

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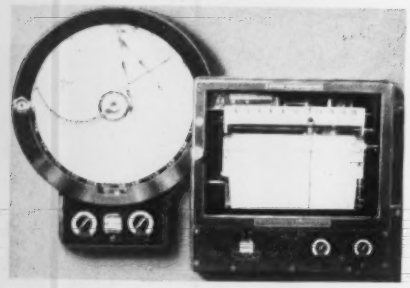

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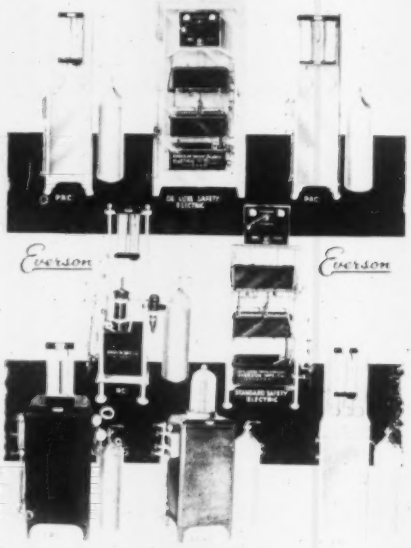

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Green, Arthur R.
Mason-Neilan Regulator
Merrit Engr. & Sales

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Bailey Meter Co.
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Foster Engr. Co.
Foxboro Co.
Hagan Corp.
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Kiely & Mueller
Mason-Neilan Regulator
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Meteon Regulator Co.
Natural Gas Equipment
Northern Equip. Co.
Republic Flow Meters Co.
Robertshaw Thermostat
Ruggles-Klingemann
Thrush & Co., H. A.
Watts Regulator Co.
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Elgin Softener Corp.
Hensley Co.
Leeds & Northrup Co.
Republic Flow Meters Co.
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CONTROLLERS, AUTOMATIC, Bulk Material Level
Bin-Dicator Co.

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Builders Iron Foundry
Everson Mfg. Co.
LaMotte Chemical Prod.
National Meter Co.
Rascher & Betzold
Victor Equipment Co.
Wallace & Tiernan

CONTROLLERS, AUTOMATIC, Combustion
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Askania Regulator Co.
Bailey Meter Co.
Brooke Eng. Co.
Brown Inst. Co.
Cambridge Inst. Co.
Cash Co.
Consulting & Engineering
Crew Equip. Co.
Defender Automatic Reg.
Denver Fire Clay Co.
Electronic Prod. Co.
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Lammert & Mann Co.
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National Brass Co.
Natural Gas Equipment
Paragon Electric Co.
Penn Electric Switch Co.
Partlow Corp.
Republic Flow Meters
R-S Products Corp.
Ruggles-Klingemann
Selas Company
Wilcox Manufacturing

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Bayleon Co.
Fisher Governor Co.
Friez & Sons
General Regulator Corp.
Industrial Instrument Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Trane Co.

COMPLETE INSTRUMENTATION

for INDUSTRIAL PROCESSES

CONTROLLERS for temperature, pressure, absolute pressure, rate of flow and liquid level. Air-operated potentiometer controllers. Exclusive features resulting in unexcelled performance.

RECORDERS of temperature, pressure, flow level, motion and absolute pressure.

INDICATORS of temperature, pressure, flow and level.

TRANSMISSION SYSTEMS, pneumatic type with exceptionally fast response. Electric signalling systems.

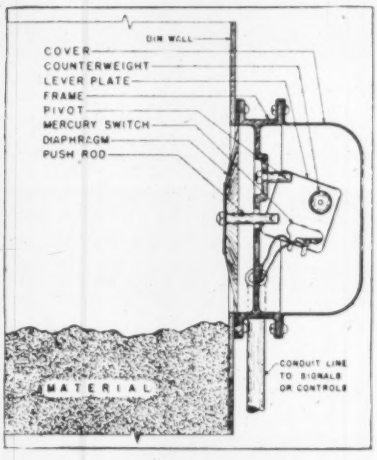
1185 ADAMS STREET — MASONEILAN — BOSTON, MASS. U.S.A.

REG. U. S. PAT. OFF.

CONTROL SPECIALISTS SINCE 1882

BIN LEVEL CONTROL

FOR BULK MATERIALS, SEMI-LIQUIDS, LIQUIDS



The Bin-Dicator in cross section showing diaphragm and switch.

ON HOPPERS and BINS

Indicates level of materials, automatically controls elevating and conveying equipment in response to fluctuating levels.

ON CONVEYORS ELEVATOR BOOTS

Indicates overfeeding, automatically shuts off drive to prevent choking.

ON WEIGHING and BLENDING EQUIPMENT

Automatically shuts off scales or feeders if material supply fails.

Varying pressure of bulk, semi-liquid or liquid materials against the Bin-Dicator diaphragm operates a mercury switch having 15 amp. rating at 125 volts a.c., 10 amp. at 250 volts. Diaphragm and switch are assembled in self-contained design with housing that measures 10 by 6 inches. Two designs for external and internal mounting.

Ask for Typical Installation Wiring Diagrams with Explanatory Notes

THE BIN-DICATOR COMPANY
14615 East Jefferson Avenue Detroit, Michigan

For addresses, see pages 54-58

CONTROLLERS, AUTOMATIC, Condenser Leakage
Leeds & Northrup Co.

CONTROLLERS, AUTOMATIC, Consistency
Bristol Co.
D'Este Co.
Foxboro Co.
Green, Arthur R.
Mason-Neilan Regulator
Merrit Engr. & Sales
Northern Equip. Co.

CONTROLLERS, AUTOMATIC, Current (See Regulators)

CONTROLLERS, AUTOMATIC, Cycle
Autocall Co.
Bailey Meter Co.
Bristol Co.
Brown Inst. Co.
Cramer & Co., Inc.
Denver Fire Clay Co.
Elec. Switch Corp.
Foxboro Co.
Hanlon Waters, Inc.
Industrial Instrument Co.

CONTROLLERS, Automatic, Cycle (Cont'd)
Leeds & Northrup Co.
Mason-Neilan Reg. Co.
Monitor Controller Co.
Southwestern Elec. Labs.
Tagliabue Mfg. Co.
Taylor Inst. Cos.

CONTROLLERS, AUTOMATIC, Damper
Alca Regulators, Inc.
Askania Regulator Co.
Atlas Valve Co.
Bailey Meter Co.
Barber-Coleman Co.
Bristol Co.
Brooke Eng. Co.
Brown Inst. Co.
Cash Co.
Cook Electric Co.
Davis-Reg. Co.
Denver Fire Clay Co.
Detroit Lubricator Co.
Electronic Prod. Co.
Foster Eng. Co.
Gleason-Avery, Inc.
Hagan Corp.
Hanlon Waters, Inc.
Hays Corp.

CONTROLLERS, Automatic, Damper (Cont'd)
Johnson Service Co.
Kiely & Mueller
Leeds & Northrup Co.
Mason-Neilan Regulator
National Airoil Burner
Natural Gas Equipment
Penn Electric Switch Co.
Powers Regulator Co.
Preferred Utilities Mfg.
Republic Flow Meters Co.
Ruggles-Klingemann
Schade Valve Mfg. Co.
Sence Eng. Co., Inc.
Tagliabue Mfg. Co.
Thrush & Co., H. A.
Trane Co.
Watts Regulator Co.
White Rodgers Electric
Wilson Mfg. Co.

CONTROLLERS, AUTOMATIC, Desuperheat
Alca Regulators, Inc.
Askania Regulator Co.
Atlas Valve Co.
Bailey Meter Co.
Hagan Corp.
Leeds & Northrup Co.

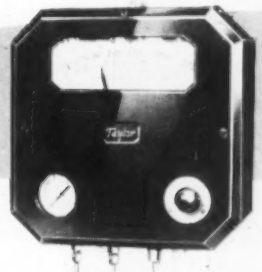
CONTROLLERS, Automatic, Desuperheat (Cont'd)
Mason-Neilan Regulator
Merrit Regulator Co.
Northern Equip. Co.
Republic Flow Meters Co.
Sence Eng. Co., Inc.
Tagliabue Mfg. Co.
Taylor Inst. Cos.

CONTROLLERS, AUTOMATIC, Draft
Alca Regulators, Inc.
Askania Regulator Co.
Atlas Valve Co.
Bailey Meter Co.
Barber-Coleman Co.
Bartlett-Hayward Co.
Bristol Co.
Brooke Eng. Co.
Brown Inst. Co.
Cash Co.
Crew Equip. Co.
Denver Fire Clay Co.
Foster Eng. Co.
General Regulator Corp.
Gleason-Avery, Inc.
Hagan Corp.

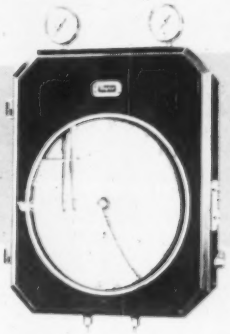
(Continued on next page)

For exact regulation of temperature and pressure . . . use Taylor

FULSCOPE CONTROLLERS



Fulscope Indicating Controller.



Fulscope Recording Controller

These indicating and recording controllers are sturdy, precise, highly adaptable.

THE BRAINS of many Taylor Systems are the famous Fulscope Controllers. These instruments, equipped with the original Universal Sensitivity Adjuster, are adaptable to practically any operating condition. Because of their simple construction and interchangeable parts, plants are able to standardize on Taylor Instruments throughout. We list below a few of the Taylor Control Instruments.

Some types of Fulscope Controllers

Indicating Temperature and Pressure Controllers, used where temperatures and pressures must be under exact control, but chart records are not necessary.

Recording Temperature and Pressure Controllers, which write on one chart, continuous, permanent records of control maintained. "Singl-Duty" type controls one temperature, "Dubl-Duty" type records two temperatures, or one temperature and one pressure.

Reset Controllers, which regulate temperature or pressure to a predetermined relation to some other varying temperature or pressure.

Dubl-Response Control Instruments, for use on extremely difficult installations, to insure straight-line control, despite varying load changes.

Time Schedule Controllers, which regulate according to a predetermined schedule.

Hygrometers, record and control wet and dry bulb temperatures, maintain relative humidity.

Flow and Liquid Level Controllers. Both indicating and recording types described elsewhere in this publication.

Self-Acting Temperature Controllers for use where compressed air is not available.

Get in touch with the Taylor Representative. Catalog sent on request. Taylor Instrument Companies, Rochester, N. Y. Plant also in Toronto, Canada.

Taylor

Indicating | Recording • Controlling

TEMPERATURE, PRESSURE, FLOW *and* LEVEL INSTRUMENTS

For addresses, see pages 54-58

Foxboro makes a comprehensive line of Air and Electric Operated Controllers for temperature, pressure, flow, liquid level and humidity. The control systems include every type from the simple Open-and-Shut Control to the Foxboro Stabilog Control System—providing the ideal type of control for every job.

For information concerning the entire line of Foxboro Instruments and Controllers refer to "Sweet's Catalog", or write for a copy of Bulletin No. 199-2. The Foxboro Company, 46 Neponset Avenue, Foxboro, Mass., U.S.A. Branch offices in 25 Principal Cities.

BAILEY METER *Combustion* CONTROL

● Bailey Meter Automatic Combustion Control of boilers results in substantial saving in fuel, increased boiler capacity, reduction of boiler and furnace maintenance, more time for operators to devote to general station maintenance, and improvement in the general character of service.

Bailey Meter Control makes possible the everyday operation of boilers at test efficiencies because it is a complete combustion control system which (1) automatically maintains steam pressure by supplying fuel and air simultaneously to boilers in accordance with changes in steam demand, (2) automatically maintains most economical fuel-air ratio by incorporating the Bailey Boiler Meter as an integral part of the system, (3) automatically maintains the desired furnace draft, and (4) automatically distributes load among boilers so that each unit carries its share.

This sturdy, inexpensive air-operated control system has been applied to all sizes and types of boilers ranging from 200 h.p. upward. It is applicable to all fuels and all methods of firing.

For further information consult Sweet's Engineering Catalogs or write for bulletin No. 102-A.

BAILEY METER COMPANY
1041 IVANHOE ROAD · CLEVELAND, O.
Bailey Meter Company Ltd., Montreal, Canada

CONTROLLERS, Automatic Condensation (Cont'd)
Hays Corp.
Leeds & Northrup Co.
Mason-Neilan Regulator
National Airoil Burner
National Brass Co.
Preferred Utilities Mfg.
Republic Flow Meters
R S Products Corp.
Ruggles-Klingemann
Taylor Inst. Cos.
Thwing & Co., H A
Trerice, W. H.
Water Level Controls Co.

CONTROLLERS, AUTOMATIC, Feed Water
Askania Regulator Co.
Atlas Valve Co.
Bailey Meter Co.
Consol. Ashcroft Hancock
Eclipse Fuel Eng. Co.
Hagan Corp.
Hardin Waters, Inc.
Hensley Co.
Kieley & Mueller
Mason-Neilan Reg. Co.
McAlear Mfg. Co.
McDonnell & Miller
Meroid Regulator Co.
Natural Gas Equipment
Northern Equip. Co.
Republic Flow Meters
Ruggles-Klingemann
Schade Valve Mfg. Co.
Thwing & Co., H. A.
Wolff Regulator Co.
Wilms Mfg. Co.

CONTROLLERS, AUTOMATIC, Filter Rate
Cochrane Corp.
International Filter Co.
Mason-Neilan Reg. Co.
Taylor Inst. Cos.

CONTROLLERS, AUTOMATIC, Float
Allen Bradley Co.
Autocall Co.
Automatic Control Co.
Automatic Temp. Control
Bailey Meter Co.
Cash Co.
Cochrane Corp.
Cutler Hammer, Inc.
Dole Regulator Co.
Detroit Lubricator Co.
Ideal Electric Co.
Illinois Engr. Co.
Hagan Corp.
Hardin Waters, Inc.

CONTROLLERS, Automatic, Float (Cont'd)
Kieley & Mueller
Mason-Neilan Regulator
McAlear Mfg. Co.
Meroid Regulator Co.
Penn Electric Switch
Powers Regulator Co.
Ruggles-Klingemann
Schade Valve Mfg. Co.
Science Eng. Co., Inc.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Water Level Controls Co.

CONTROLLERS, AUTOMATIC, Flow
American Meter Co.
Bailey Meter Co.
Brown Inst. Co.
Bristol Co.
Cash Co.
Denver Fire Clay Co.
Electrimatic Corp.
Foster Engr. Co.
Foxboro Co.
General Regulator Corp.
Hardin Waters, Inc.
International Filter Co.
Leeds & Northrup Co.
Mason-Neilan Regulator
Meroid Regulator Co.
Republic Flow Meters
Science Eng. Co., Inc.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Thwing & Co., H. A.
Victor Equipment Co.
Wilgus Mfg. Co.

CONTROLLERS, AUTOMATIC, Flow Proportioning
American Meter Co.
Area Regulators, Inc.
Askania Regulator Co.
Autocall Co.
Automatic Temp. Control
Bailey Meter Co.
Barber Coleman Co.
Bristol Co.
Brooke Eng. Co.
Brown Inst. Co.
Builders Iron Foundry
Cash Co.
Cochrane Corp.
Cutler Hammer, Inc.
Eclipse Fuel Engr. Co.
Electronic Prod. Co.
Fischer & Porter
General Regulator Corp.
Hagan Corp.
Hardin Waters, Inc.

CONTROLLERS, Automatic, Flow Proportioning (Cont'd)
Hensley Co.
Illinois Engr. Co.
International Filter Co.
Lammert & Mann Co.
Mason-Neilan Regulator
McAlear Mfg. Co.
Meroid Regulator Co.
Republic Flow Meters Co.
Reynolds Gas Regulator
Science Engr. Co., Inc.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Vergette Co.
Victor Equipment Co.
Wheelco Inst. Co.

CONTROLLERS, AUTOMATIC, Fluid Proportioning
American Meter Co.
Area Regulators, Inc.
Askania Regulator Co.
Bailey Meter Co.
Bristol Co.
Brown Inst. Co.
Builders Iron Foundry
Cash Co.
Cochrane Corp.
Electronic Prod. Co.
Fischer & Porter
General Regulator Corp.
Hagan Corp.
Hardin Waters, Inc.
Hensley Co.
International Filter Co.
Mason-Neilan Regulator
Meroid Regulator Co.
Phinney & Bird, Inc.
Tagliabue Mfg. Co.
Taylor Inst. Cos.

CONTROLLERS, AUTOMATIC, Frequency (See Regulators)

CONTROLLERS, AUTOMATIC, Furnace
Atl. Gas Furnace Co.
Area Regulators, Inc.
Askania Regulator Co.
Automatic Elec. Mfg. Co.
Automatic Temp. Control
Bailey Meter Co.
Barber Coleman Co.
Bristol Co.
Brooke Eng. Co.
Brown Inst. Co.
Cash Co.
Cook Electric Co.
Defender Automatic Reg.

CONTROLLERS, Automatic, Furnace (Cont'd)
Denver Fire Clay Co.
Detroit Lubricator Co.
Dickson Co.
Eclipse Fuel Engr. Co.
Friez & Sons
Fulton Sylphon Co.
General Regulator Corp.
Gleason Avery, Inc.
Hagan Corp.
Hays Corp.
Industrial Engr. Corp.
Johnston Mfg. Co.
Leeds & Northrup
Lindberg Eng. Co.
Mason-Neilan Regulator
Meroid Co.
National Airoil Burner
National Brass Co.
Natural Gas Equipment
Paragon Electric Co.
Partlow Corp.
Payne Furnace & Supply
Penn Electric Switch
Perfex Corp.
Pyrometer Inst. Co.
Republic Flow Meters
R S Products Corp.
Ruggles-Klingemann
Sargent Time Control
Science Engineering Co.
Stetser Thermostat Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
United Cinephonic Corp.
Wheelco Inst. Co.
White Mfg. Co.
White Rodgers Electric
Wilgus Mfg. Co.

CONTROLLERS, AUTOMATIC, Gas Mixing (See Controllers, Automatic, Flow Proportioning)

CONTROLLERS, AUTOMATIC, Granular Material Level
Bin-Dicator Co.

CONTROLLERS, AUTOMATIC, Gravity
Area Regulators, Inc.
Askania Regulator Co.
Bailey Meter Co.
Brinkley, G. S.
Mason-Neilan Regulator
Mine & Smelter Supply
Tagliabue Mfg. Co.
Taylor Inst. Cos.

CONTROLLERS, AUTOMATIC, Humidity
American Moistening Co.
Area Regulators, Inc.
Atlas Valve Co.
Barber Coleman Co.
Bristol Co.
Brown Inst. Co.
Consol. Ashcroft Hancock
Cramer & Co., Inc.
Detroit Lubricator Co.
Dietert Co.
Electronic Prod. Co.
Fenwal, Inc.
Foxboro Co.
Friez & Sons
General Controls Co.
H-B Inst. Co., Inc.
Industrial Inst. Co.
Johnson Service Co.
Leeds & Northrup Co.
Mason-Neilan Regulator
McDonnell & Miller
Moeller Instrument Co.
Parks-Cramer Co.
Penn Electric Switch
Phila. Thermometer Co.
Powers Regulator Co.
Robertshaw Thermostat
Sarco Co., Inc.
Scientific Inst. Co.
Southwestern Electronics
Stickle Steam Specialties
Supreme Elec. Prods.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Thwing-Albert Inst. Co.
Vaughn G. E. Witt Co.

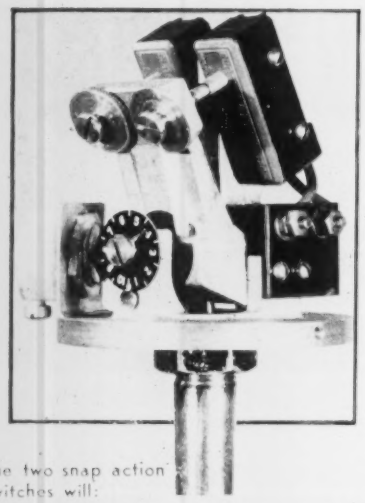
CONTROLLERS, AUTOMATIC, Humidity and Temperature (See Controllers, Automatic, Humidity and Controllers, Automatic, Temperature)
American Inst. Co.

CONTROLLERS, AUTOMATIC, Lighting
Cutler Hammer, Inc.
Luxtrol Co., Inc.
Paragon Electric Co.
Southwestern Electronics
United Cinephonic Corp.
Weston Elec. Inst. Corp.
Zenith Electric Co.

CONTROLLERS, AUTOMATIC, Liquid Level
Allen-Bradley Co.
American Meter Co.
Area Regulators, Inc.

CONTROLLERS, Automatic, Liquid Level (Cont'd)
Askania Regulator Co.
Atlas Valve Co.
Autocall Co.
Bailey Meter Co.
Belfield Co.
Brinkley, G. S.
Bin-Dicator Co.
Bayleton Co.
Bristol Co.
Brown Inst. Co.
Builders Iron Foundry
Cash Co.
Cochrane Corp.
Consol. Ashcroft Hancock
Cutler Hammer, Inc.
Davis Reg. Co.
Electronic Prod. Co.
DeEste Co.
Elec. Indicator Co.
Fisher Governor Co.
Foster Engr. Co.
Foxboro Co.
Frick Co.
Furnas Electric Co.
General Controls Co.
General Regulator Corp.
Guardian Elec. Mfg. Co.
Hagan Corp.
Hardin Waters, Inc.
International Filter Co.
Johnson Service Co.
Kiely & Mueller
Kipfel Mfg. Co.
Lumenite Elec. Co.
Luxtrol Co., Inc.
Mason-Neilan Regulator
McAlear Mfg. Co.
McDonnell & Miller
Meroid Corp.
Mercoid Regulator Co.
National Airoil Burner
Natural Gas Equipment
Northern Equip. Co.
Paragon Electric Co.
Powers Regulators Co.
Precision Therm. & Inst.
Preferred Utilities Mfg.
Republic Flow Meters
Schade Valve Mfg. Co.
Spence Engineering Co.
Stets Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Tolding Instrument Co.
Water Levels Controls Co.
Watts Regulator Co.
Wheelco Inst. Co.
Wilms Mfg. Co.

CONTROLLERS, AUTOMATIC, Load (See Regulators)



The two snap action switches will:

A. Control heating or cooling or both.
B. Control the temperature and give either a high or low limit device.
C. Give either two or three step control.
D. Give floating control with reversing control motors.
E. Give two or three speed control of auxiliary motors.

Available for temp. —100 to 1400° F. Other models with special alloy tubes suitable up to 1800° F.

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BURLING INSTRUMENT COMPANY
239-241 Springfield Ave., Newark, N. J.

Bailey
FEED WATER
Control

● Bailey Meter Company offers three distinct feed water control systems. They are (1) the Thermo-hydraulic Feed Water Regulator which is suitable for the majority of small boilers operating at relatively low pressures. This regulator operates from water level alone and is provided with a fully balanced tight seating V-port regulating valve designed to give a straight line characteristic. It offers the advantages of low installation cost, removable valve parts and independence of valve location.

(2) The Single-Element air-operated feed water control system is recommended for installations on which smooth regulation of feed water flow is desired, and a wide regulating range cannot be used. This system is controlled by water level alone as measured by a Bailey Boiler Drum Water Level Recorder.

(3) Bailey Three-Element feed water control is recommended for high capacity low water storage boilers operating at high pressures or for boilers operating at medium pressures with violent load fluctuations. This system is based on actual measurement of water flow to the boiler, steam flow from the boiler and water level within the boiler, and is adjusted primarily to control the rate of water flow to the boiler so that it equals the rate of steam flow from the boiler.

For detailed information consult Sweet's Engineering Catalogs or request bulletin ● No. 183.

BAILEY METER COMPANY
1041 IVANHOE ROAD · CLEVELAND, O.
Bailey Meter Company Ltd., Montreal, Canada

MAKE YOUR PLANT
EXPLOSION PROOF
24 HOURS A DAY

FLAME-OTROL

is the only instant acting safety control designed to operate on gas, oil or powdered coal. FLAME-OTROL is the only instrument of its kind approved and listed by both Associated Factory Mutual and Underwriters Laboratory.

Write for Bulletin No. 1101

Wheelco Instruments Co.
1933 So. Halsted St. Chicago, Ill.

For addresses, see pages 54-58

Controllers FOR AUTOMATIC REGULATION OF TEMPERATURE, COMBUSTION, pH, ETC.

Micromax Electric Control for temperature, etc., consists of Micromax instrument with valve-drive and relay developed and engineered as a unit to provide speed, sensitivity and accuracy. Simple, easy to install, low in maintenance.

Metermax Combustion Control is a unit system which automatically proportions fuel and air for efficient combustion in boiler and industrial furnaces. Special controls for special problems. Information on request.

LEEDS & NORTHRUP CO.
4984 STENTON AVENUE, PHILADELPHIA

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

CONTROLLERS, AUTOMATIC, Moisture (See Controllers, Automatic, Humidity)

CONTROLLERS, AUTOMATIC, Phase (See Regulators)

CONTROLLERS, AUTOMATIC, Phosphate Feed
Cochrane Corp.
Fischer & Porter
Hagan Corp.

CONTROLLERS, AUTOMATIC, Power Factor (See Regulators)

CONTROLLERS, AUTOMATIC, Pressure
Arms Regulator Co.
Allen Bradley Co.
Askania Regulator Co.
Area Regulators, Inc.
Atlas Valve Co.
Autocall Co.
Automatic Control Co.
Automatic Temp. Control
Bailey Meter Co.
Baldwin Southwark Corp.
Bastian-Blessing Co.
Bellfield Co.
Booker & Co.
Bowerston Co.
Bristol Co.
Brooke Eng. Co.
Brown Inst. Co.
Builders Iron Foundry
Cash Co.

CONTROLLERS, Automatic, Pressure (Cont'd)
Connecticut Iron Sponge Co.
Consol. Ashcroft Hancock
Cutler Hammer, Inc.
Davis Reg. Co.
De Laval Co.
Dickson Co.
Eclipse Fuel Engg.
Empson Apparatus Co.
Fisher Governor Co.
Ford Reg. Valve Co.
Foster Engg. Co.
Foxboro Co.
Friez & Sons
Furnas Electric Co.
Gas And Specialties
General Controls Co.
General Regulator Corp.
Gen. Sales & Prod.
Hanlon Waters, Inc.
Hays Corp.
Hoke, Inc.
Hydraulic Press Co.
Industrial Inst. Co.
Klipfel Mfg. Co.
Lammert & Mann Co.
Leeds & Northrup Co.
Leslie Co.
Mason-Neilan Regulator
McDonnell & Miller
Mercoid Corp.
Meroon Regulator Co.
Natural Gas Equip. Inc.
Northern Equip. Co.
Penn Electric Switch
Perfex Corp.
Powers Regulator Co.
Precision Therm. & Inst.
Rateo Inc.
Republic Flow Meters

CONTROLLERS, Automatic, Pressure (Cont'd)
Reynolds Gas Regulator
Robertshaw Thermostat
Ruggles Klingemann
Southwestern Electronics
Schade Valve Mfg. Co.
Scientific Inst. Co.
Spence Engineering Co.
Spencer Thermostat Co.
Sterling Elec. Co.
Taglıabue Mfg. Co.
Taylor Inst. Cos.
Thrush & Co., H. A.
Uehling Instrument Co.
Vapor Recovery Systems
Vaughn G. E. Witt Co.
Varlet Equipment Co.
Ward Leonard Elec. Co.
Water Level Controls Co.
Watts Regulator Co.
Wheelco Inst. Co.
White Rotors Electric
Wilgus Mfg. Co.

CONTROLLERS, AUTOMATIC, Pyrometric
Ace Gas Equipment Co.
Askania Regulator Co.
Automatic Temp. Control
Bailey Meter Co.
Bristol Co.
Brown Inst. Co.
Burling Inst. Co.
Dickson Co.
Electronic Lab.
Electronic Prod. Co.
Engelhard, Chas.
Ferner Co.
Foxboro Co.
General Elec.
G-M Labs.
Hagan Corp.
Hallett Mfg. Co.
Ill. Testing Labs.
Industrial Instruments
Leeds & Northrup Co.
Lewis Engg. Co.
Lindberg Eng. Co.
Mason-Neilan Regulator
Partlow Corp.
Pyrometer Instrument Co.
R. S. Products Corp.
Southwestern Electronics Labs.
Taglıabue Mfg. Co.
Taylor Inst. Cos.
Thwing-Albert Instrument
Uehling Instrument Co.
Wheelco Inst. Co.

CONTROLLERS, AUTOMATIC, Radio Remote
Ace Gas Equipment Co.
Guardian Elec. Mfg. Co.
RCA Manufacturing Co.
United Controls Corp.

CONTROLLERS, AUTOMATIC, Rate-Volume
Askania Regulator Co.
Brown Inst. Co.
Cash Co.
Fischer & Porter
Foxboro Co.
Hagan Corp.
Hanlon Waters, Inc.
Taylor Inst. Cos.

CONTROLLERS, AUTOMATIC, Refrigeration
Allen-Bradley Co.
Brown Inst. Co.
Cash Co.
Curtis Refrigerator Co.
De Laval Co.
Dorsey Refrigerator Co.
Dickson Co.
Electromatic Corp.
Frick Co.
Fulton Sylphon Co.
General Controls Co.
Hanlon Waters, Inc.
Kooltronic Elec. Co.
Mason-Neilan Regulator
Meroid Corp.
Penn Electric Switch
Perfex Corp.
Phila. Thermometer Co.
Saron Co., Inc.
Schade Valve Mfg. Co.
Taglıabue Mfg. Co.
Taylor Inst. Cos.
White Rotors, Electric

CONTROLLERS, AUTOMATIC, RKVA (See Regulators)

CONTROLLERS, AUTOMATIC, Specific Gravity (See Controllers, Automatic, Gravity)

CONTROLLERS, AUTOMATIC, Speed (See Tachometric below)

CONTROLLERS, AUTOMATIC, Stoker (See Controllers, Automatic, Furnace)

CONTROLLERS, AUTOMATIC, Strain-Rate & Stress-Rate
Baldwin Southwark Corp.

CONTROLLERS, AUTOMATIC, Synchronizing (See Regulators)

CONTROLLERS, AUTOMATIC, Tachometric
Askania Regulator Co.
Bailey Meter Co.
Barbour Stockwell Co.
Brown Inst. Co.
Cutler Hammer, Inc.
Foxboro Co.
General Regulator Corp.
Mason-Neilan Regulator
Monitor Controller Co.
Republic Flow Meters

CONTROLLERS, AUTOMATIC, Temperature (See Pyrometric above or Thermometric below)

CONTROLLERS, AUTOMATIC, Temperature-Time (See Controllers, Automatic, Thermometric; Controllers, Automatic, Thermostatic; Controllers, Automatic, Time)

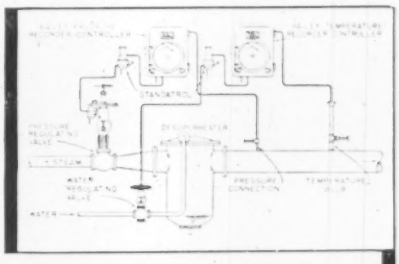
CONTROLLERS, AUTOMATIC, Thermometric
Bailey Meter Co.
Bristol Co.
Brown Inst. Co.
Burling Inst. Co.
Cutler Hammer, Inc.
Dickson Co.
Edison Electrical Controls
Electronic Mfg. Co.
Electric Machine Lab.
Electronic Prod. Co.
Fenwal Automatic Controls
Fish-Schurman Co.
Foxboro Co.
Friez & Sons
General Elec. Co.
General Regulator Corp.
Walter J. Halperin
H B Inst. Co., Inc.
Ill. Testing Labs.
Lindberg Eng. Co.
Moeller Instrument Co.
Paragon Electric Co.
Parks-Cramer Co.
Partlow Corp.
Precision Therm. & Inst.
Scientific Inst. Co.
Southwestern Electronics
Taglıabue Mfg. Co.
Taylor Inst. Cos.
Wheelco Inst. Co.

CONTROLLERS, AUTOMATIC, Thermostatic
Aeronautic Scientific Inst.
Allen Bradley Co.
American Inst. Co.
Askania Regulator Co.
Atlas Valve Co.
Bailey Meter Co.
Barber-Coleman Co.
Booker & Co.
Bristol Co.
Bryan Steam Engine
Brown Inst. Co.
Burling Inst. Co.
Bushnell Mfg. Co.
Cash Co.
Cook Electric Co.
Cramer & Co., Inc.
De Laval Co.
Dorsey Refrigerator Co.
Dickson Co.
Edison Electrical Controls
Electronic Control Corp.
Ernstar Co.
Fenwal, Inc.

CONTROLLERS, Automatic, Thermostatic (Cont'd)
Fish-Schurman Co.
Friez & Sons
Foster Engg. Co.
Fulton Sylphon Co.
General Engineering Co.
General Elec. Co.
Gilson Accty. Inc.
H B Inst. Co., Inc.
Halperin, Walter J.
Hanlon Engg. Co.
Industrial Engr. Corp.
Johnson Service Co.
Kooltronic Elec. Co.
Kreisler Mfg. Co.
Leeds & Northrup Co.
Mercoid Corp.
Minneapolis Honeywell Regulator Co.
Partlow Corp.
Penn Electric Switch
Perfex Corp.
Phila. Thermometer Co.
Powers Regulator Co.
Precision Therm. & Inst. Co.
Rateo Inc.
Ranco Inc.
Robertshaw Thermostat
Ruggles Klingemann
Saron Co., Inc.
Southwestern Electronics
Spencer Thermostat Co.
Stanley Elec. Co.
Sterling Elec. Co.
Stromberg-Carlson
Taglıabue Mfg. Co.
Thrush & Co., H. A.
Trabon Eng. Co.
Vaughn G. E. Witt Co.
Weston Elec. Inst. Corp.
White Mfg. Co.
White Rotors, Elec. Co.

CONTROLLERS, AUTOMATIC, Time
Allen Bradley Co.
Ace Gas Equipment
Arms Reg. Co.
Automatic Temp. Control
Bailey Meter Co.
Bristol Co.
Cash Co.
Cramer & Co., Inc.
Dwyer Instrument
Eclipse Fuel Engg.
Foxboro Co.
General Elec. Co.
Gilson Accty. Inc.
Hanlon Waters, Inc.
Hoke, Inc.
Industrial Instruments
Johnson Service Co.
Luetrol Co., Inc.
Minneapolis Honeywell Regulator Co.
Mercoid Corp.
Penn Electric Switch
Powers Regulator Co.
Precision Therm. & Inst.
Scientific Instruments
Taglıabue Mfg. Co.
Taylor Inst. Cos.
Thrush & Co., H. A.
Uehling Instrument Co.
Watson Temperature Co.
Zelnick Electric Co.

CONTROLLERS, AUTOMATIC, Vacuum
Allen Bradley Co.
Arms Reg. Co.
Ace Regulators, Inc.
Askania Regulator Co.
Bailey Meter Co.
Cochrane Corp.



DESUPERHEATING & PRESSURE REDUCING CONTROL

● Bailey Meter Control of desuperheating and pressure reducing incorporates standard Bailey Recorder-Controllers for both pressure and temperature, as well as a special Bailey Reducing Valve equipped with valve positioner and air cooled packing gland.

The control system is air-operated and is arranged to maintain the desired final steam temperature by controlling the quantity of water fed to a cartridge type desuperheater. This temperature is measured by a sensitive bare bulb temperature recorder-controller with the temperature bulb located at the
● outlet of the desuperheater.

BAILEY METER COMPANY
1041 IVANHOE ROAD · CLEVELAND, O.
Bailey Meter Company Ltd., Montreal, Canada

TEMPERATURE SUPREMACY

CAPACITROL
Temperature Control

Actually 80% closer temperature control than the best mechanical instrument you can buy. There is no time lag between temperature deviation and control action. Closer control is not possible, yet CAPACITROL sells in the lower price ranges.

Wheelco catalog should be in your library—WRITE TODAY.

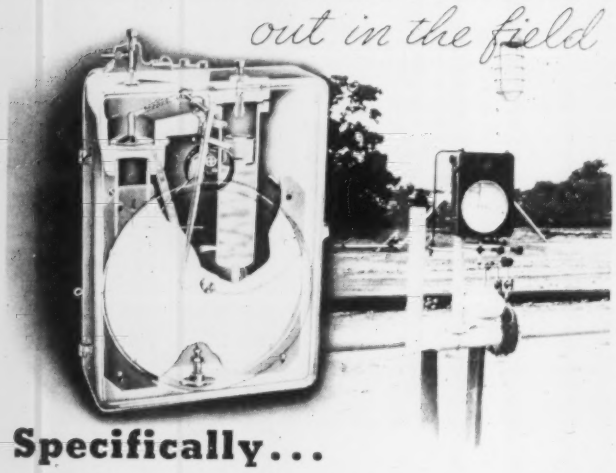
Wheelco Instruments Co.
1933 So. Halsted St. Chicago, Ill.

For addresses, see pages 52-58

Why

Low Maintenance

out in the field



Specifically...

Examine the rugged construction of Westcott orifice meters . . . selected materials . . . parts of forged or hardened stainless steel, special alloys . . . screw and welded connections. Note simplicity in design, facilities for easy adjustment . . . easy cleaning. The Westcott is a PRACTICAL engineering instrument. Complete literature available.

AMERICAN METER COMPANY
METRIC METAL WORKS *ERIE, PENNSYLVANIA*

CONTROLLERS, Automatic Vacuum (Cont'd)
Bayleton Co.
Bristol Co.
Brooke Eng. Co.
Brown Inst. Co.
Cash Co.
Cotton, Arthur Hancock
Cutler-Hammer, Inc.
Davis Reg. Co.
DeLeeuw Co.
Detroit Lubricator Co.
Electronic Prod. Co.
Fisher Governor Co.
Foster Eng. Co.
Foxboro Co.
Fullam Syphon Co.
Gas Appl. Specialties Co.
General Elec. Co.
Hanlon Waters, Inc.
Illinois Engr. Co.
Kimball Mfg. Co.
Mason-Neilan Regulator
McAlear Mfg. Co.
Natural Gas Equip. Inc.
Northern Equip. Co.
Penn Electric Switch Co.
Perfex Corp.
Powers Regulator Co.
Precision Therm. & Inst.
Schade Valve Mfg. Co.
Scientific Inst. Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Vaughn G. E. Wyr Co.
White Rodgers Electric
Wilcox Mfg. Co.

CONTROLLERS, AUTOMATIC, Valve (See Valve-Operating Devices)

CONTROLLERS, AUTOMATIC, Viscosity
Bailey Meter Co.
Foxboro Co.
General Elec. Co.
Green, Arthur B.
Scientific Inst. Co.
United Cinephone Corp.

CONTROLLERS, AUTOMATIC, Voltage (See Regulators)

CONTROLLERS, AUTOMATIC, Volume
Atra Regulators, Inc.
Askania Regulator Co.
Brown Inst. Co.
Cash Co.
Foxboro Co.
Hagan Corp.
Hanlon Waters, Inc.
Mason-Neilan Regulator
United Cinephone Corp.

CONTROLLERS, MANUAL (Non-automatic), Field
Cutler-Hammer, Inc.
General Elec. Co.
Monitor Controller Co.
National Elec. Controller
Schaefer Bros. Co.
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg.

CONTROLLERS, MANUAL (Non-automatic) Motor
Allen-Bradley Co.
Cutler-Hammer, Inc.
Elec. Controller & Mfg.
Firmas Electric Co.
General Elec. Co.
Monitor Controller Co.
National Elec. Controller
Schaefer Bros. Co.
Southwestern Electronics
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg.

CONTROLLERS, MANUAL (Non-automatic) Rheostatic
Allen Bradley Co.
Allis Chalmers Mfg. Co.
Cutler-Hammer, Inc.
Elec. Controller & Mfg.
General Elec. Co.
Monitor Controller Co.
National Elec. Controller
Ohmite Mfg. Co.
Rubicon Co.
Schaefer Bros. Co.
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg.

CONTROL SYSTEMS (See Controllers, Automatic)

COUNTERS, Alarm
Durant Mfg. Co.

COUNTERS, Cycle
Addo-X Co.
Bristol Co.
General Elec. Co.
Industrial Inst. Co.
Paragon Electric Co.
Raytheon Mfg. Co.
Southwestern Electronics
Standard Elec. Time Co.
States Co.
United Cinephone Corp.
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg.

COUNTERS, Footage
Addo-X Co.
Bristol Co.
Durant Mfg. Co.
Elec. Tachometer Corp.
McDonnell Odometer Co.

COUNTERS, Footage (Cont'd)
Ohmer Register Co.
Southwestern Electronics
United Cinephone Corp.
Veeder-Root, Inc.

COUNTERS, Hour
Cramer & Co., Inc.
Elec. Tachometer Corp.
General Elec. Co.
Ohmer Register Co.
Paragon Electric Co.
Southwestern Electronics
United Cinephone Corp.
Warren Telechron Co.
Westinghouse Elec. & Mfg.

COUNTERS, Lumber
Addo-X Co.
Durant Mfg. Co.
Kendall & Esser Co.
McDonnell Odometer Co.
Southwestern Electronics
Tally Meter Co.

COUNTERS, Production
Addo-X Co.
Bristol Co.
Cramer & Co., Inc.
Durant Mfg. Co.
Elec. Tachometer Corp.
Guardian Elec. Mfg. Co.
Hart Mfg. Co., R. E.
Luxtrol Co., Inc.
McDonnell Odometer Co.
Mosher Mfg. Co.
Ohmer Register Co.
Photobell Corp.
Production Inst. Co.
Richardson Scale Co.
Southwestern Electronics
Struthers Dunn
United Cinephone Corp.
Veeder-Root, Inc.

COUNTERS, Revolution
Addo-X Co.
Bristol Co.
Boulin Instrument Corp.
Cummings Machine Wks.
Durant Mfg. Co.
Elec. Tachometer Corp.
Gurley, W. & L. E.
Hart Mfg. Co., R. E.
Ideal Commutator Dresser
Jaeger Watch Co.
Johns-Manville Sales Co.
Luxtrol Co., Inc.
Marsh Corp., Jas. P.
Mason-Neilan Regulator
McDonnell Odometer Co.
Mosher Mfg. Co.
Ohmer Register Co.
Production Inst. Co.
George Scherr Co., Inc.
Southwestern Electronics
Standard Elec. Time Co.
Veeder-Root, Inc.
Warren Telechron Co.

COUNTERS, Revolution (Cont'd)
Weston Elec. Inst. Corp.

COUNTERS, Stroke
Addo-X Co.
Bristol Co.
Durant Mfg. Co.
Eagle Signal Corp.
Guardian Elec. Mfg. Co.
Hart Mfg. Co., R. E.
International Register Co.
Luxtrol Co., Inc.
McDonnell Odometer Co.
Photobell Corp.
Ohmer Register Co.
Production Inst. Co.
Southwestern Electronics
United Cinephone Corp.
Veeder-Root, Inc.

COUNTERS, Twist
Boulin Instrument Corp.
Luxtrol Co., Inc.
McDonnell Odometer Co.
Roller-Smith Co.
Saxl Instrument Co.
Southwestern Electronics
Sutel, Alfred

COURSE PROTRACTORS (See Protractors, Course)

CRYSTALS, Piezoelectric
Bliley Electric Co.
Bruesh Development Co.
General Radio Co.
Premier Crystal Labs.
RCA Manufacturing Co.
Valpey Crystals
Zeiss, Inc., Carl

CRYSTALS, Quartz
Bliley Electric Co.
Fuess, Inc.
General Radio Co.
Master Optical Co.
Premier Crystal Labs.
RCA Manufacturing Co.
Valpey Crystals

CRYSTALS, Rochelle Salt
Brush Development Co.

CRYSTALS, Tourmaline
Fuess, Inc.
Premier Crystal Labs.
Zeiss, Inc., Carl

CUBIC FOOT BOTTLES (See Bottles, Cubic Feet)

CURRENT LIMITERS
General Elec. Co.
Monitor Controller Co.

CURRENT METERS (See Meters, Current)

CURRENT REGULATORS (See Regulators, Current)

CURVE TRACERS (See Drawing Instruments)

CUTMETERS
Amthor Testing Inst. Co.
Goetz Mach. Tool Co.
McDonnell Odometer Co.

CYCLE CONTROLLERS (See Controllers, Cycle)

CYCLE COUNTERS (See Counters, Cycle)

CYCLOMETERS
Veeder-Root, Inc.

CYLINDERS, GRADUATED (See Apparatus, Laboratory, Glass)

DECELEROMETERS (See Accelerometers)

DECIBEL METERS (See Sound Level Meters)

DEEP SEA INSTRUMENTS
Ballauf Mfg. Co.

DEFLECTION TESTERS, Light Wave (See Testers, Deflection, Light Wave)

DEFORMETER
Baldwin Southwark Corp.
Dietert Co.
Holz, Herman A.

DELINEASCOPES
Bausch & Lomb
Central Scientific Co.
Leitz, Inc.
Spencer Lens Co.

DEMAND Indicators (See Meters, Demand, Electric; Meters, Demand, Gas)

DEMAND, Recorders
Bailey Meter Co.
Esterline-Angus Co.
General Elec. Co.
Lambert Meter Co.
Landis & Gyr, Inc.
Lincoln Meter Co.
Westinghouse Elec. & Mfg.

DEMAND — LIMITING METERS (See Meters, Demand Limiting)

DEMAND METERS (See Meters, Demand)

DEMAND TOTALIZING RELAYS & DEVICES (See Relays, Demand Totalizing)

DENSIMETERS
Akatos, Inc.
Natl. Aluminate Corp.
Pfaltz & Bauer, Inc.
Tagliabue Mfg. Co.

DENSOMETERS
Gaertner Scientific Corp.
Gurley, W. & L. E.
Tagliabue Mfg. Co.
Zeiss, Inc., Carl

DEPTH, Indicators, Length
Chesapeake Ind. Inst. Co.
Federal Prod. Corp.
Starrett Co.

DEPTH, Indicators, Liquid
Bacharach Industrial Inst.
Bailey Meter Co.
Elec. Indicator Co.
Foxboro Co.
Geophysical Inst. Co.
Mason-Neilan Regulator
Morey & Jones, Ltd.
Tagliabue Mfg. Co.
Uehling Instrument Co.

DEPTH, Recorders, Liquid
Bailey Meter Co.
Elec. Indicator Co.
Foxboro Co.
Geophysical Inst. Co.
Mason-Neilan Regulator
Tagliabue Mfg. Co.

DETECTOR CARS, For Testing Rails in Track
Sperry Products, Inc.

DETECTORS, Benzol
Mine Safety Appliances

DETECTORS, Carbon Monoxide
Mine Safety Appliances

DETECTORS, Hydrogen Cyanide
Mine Safety Appliances

DETECTORS, Hydrogen Sulphide
Mine Safety Appliances

DETECTORS, Mercury Vapor
Mine Safety Appliances

DETECTORS, Metal
Associated Research
General Elec. Co.
Geophysical Inst. Co.
Ill. Testing Labs.
Luxtrol Co., Inc.
McFarlin Co.
RCA Manufacturing Co.
Southwestern Electronics
United Cinephone Corp.

DETECTORS, Methane
Mine Safety Appliances

DETECTORS, Mine Gases
Bushnell, R. O.
Mine Safety Appliances
Southwestern Electronics Labs.

DETECTORS, Potential
Littelfuse Labs.
Mineralac Electric Co.

DETECTORS, Radium
American Inst. Co.

DETECTORS, Voltage
Allen Elec. & Equip. Co.
General Elec. Co.
Gen. Physical Laboratory
Ideal Commutator Dresser
Meter Devices Co.
Mineralac Electric Co.

DIAL INDICATORS (Length)
Ames Co., B. C.
Brown & Sharpe
Chicago Dial Ind. Co.
Federal Prod. Corp.
Premier Crystal Labs.
Scientific Inst. Co.
Starrett Co.

DIAL MICROMETERS (See Micrometers, Dial)

DIFFERENTIAL PRESSURE (See Controllers, Gages, etc., Pressure)

DIFFRACTION GRATING (See Grating, Diffraction)

DILATOMETERS
American Inst. Co.
Dietert Co.
Ferner Co.
Gaertner Scientific Corp.
E. Leitz, Inc.
Rockwell Co., Stanley P.
Zeiss, Inc., Carl

DIVIDERS, Voltage (Radio Frequency)
Andrew, Victor J.
General Elec. Co.
General Radio Co.
International Resistance
Muter Company
Ohmite Mfg. Co.
Sensitive Research Inst.
Shalleross Mfg. Co.
Ward Leonard Elec. Co.

DIVIDING HEAD, OPTICAL
Zeiss, Inc., Carl

DIVIDING MACHINES
American Askania Corp.
Brown & Sharpe
Gaertner Scientific Corp.
Hayes Scientific Apps.
Holz, Herman A.
Micro Instrument Co.
Precise Instrument Co.

DRAFT, Indicators (See Gages, Draft) **Recorders** (See Gages, Draft)

DRAWING INSTRUMENTS
Alpha Instrument Co.
Altender & Sons
Dietzgen Co.
Gurley, W. & L. E.
Henschel & Co.
Keuffel & Esser Co.
Millers Falls Co.
Post Co., Frederick
Soltmann, Inc., E. G.
Spendel & Co.
Starrett Co., L. S.
Union Tool Co.
United States Blue Print
Warren Knight Co.
Weber Co., F.
White Co., Inc., David

DRIFT INDICATORS
Driftmeters, Inc.
Gurley, W. & L. E.
Kollmorgen Optical Co.
Kotlsman Inst. Co.
Pioneer Instrument Co.

DRIFT INDICATORS, Bore Hole
Sperry Sun Well Surveying

DUROMETERS (See Testers & Testing Machines, Hardness)

DUST ANALYSIS APPARATUS
Bausch & Lomb Optical
Central Scientific Co.
Corning Glass Works
Eimer & Amend
Falstrom Co.
Federal Pneumatic Systems
Fisher Scientific Co.
Macalaster Bicknell Co.
Mine Safety Appliances
Pfaltz & Bauer, Inc.
Sargent & Co.
Scientific Glass Apparatus
Scientific Inst. Co.
Southwestern Electronics
Willson Products, Inc.
Zeiss, Inc., Carl

DYNAMOMETERS, Hydraulic
Taylor Mfg. Corp.

DYNAMOMETERS, Pull Rod
Hayes Scientific Apps.
Martin Decker Corp.
Seederer-Kohlbusch, Inc.

DYNAMOMETERS, Rotary Absorption
Bristol Co.
General Elec. Co.
L. A. B. Corp.

DYNAMOMETERS, Tension
Baldwin-Southwark Corp.
Boulin Instrument Corp.
Holz, Herman A.
Olsen Testing Machine
Riehle Div.
Seederer-Kohlbusch

DYNAMOMETERS, Torsion
Holz, Herman A.

DYNAMOMETERS, Transmission
Holz, Herman A.
Seederer-Kohlbusch

DYNAMOMETER CARS, Railway
Holz, Herman A.

For addresses, see pages 54-58

EARTH CURRENT METERS (See Meters, Earth Current)

EARTH RESISTANCE METERS
American Inst. Co.
Biddle Co., Jas. G.
Geophysical Inst. Co.
Industrial Insts. Inc.
Rawson Electrical Inst.
Rubicon Co.
Southwestern Electronics
Sticht & Co.

EBULLIOMETERS
American Inst. Co.
Braun Corp.
Central Scientific Co.
Eimer & Amend
Precision Therm. & Inst.
Fischer & Betzold
Tagliabue Mfg. Co.

EBULLISCOPE (See Ebulliometers)

ECHELON GRATING (See Grating, Echelon)

ELECTRIC WAVE FILTER SECTIONS
Andrew, Victor J.
Bliley Electric Co.
Clough-Brengle Co.
General Radio Co.
United Transformer Corp.

ELECTROMETERS, Quadrant
Cambridge Inst. Co.
Central Scientific Co.
Pfaltz & Bauer, Inc.
Precise Instrument Co.
Rubicon Co.
Tocrite Instrument Co.
Welch Mfg. Co.

ELECTROMETERS, String
Cambridge Inst. Co.
Geophysical Inst. Co.
Pfaltz & Bauer, Inc.

ELECTRONIC METERS (See Meters, Electronic)

ELECTROPLATING SOLUTION TESTING APPARATUS
Central Scientific Co.
Fisher Scientific Co.
Hellige, Inc.
Industrial Insts. Inc.
Pfaltz & Bauer, Inc.
Sargent & Co.
Taylor & Co., Inc., W. A.
Thwing-Albert Inst. Co.

ELECTROSCOPES
Chicago Apparatus Co.
Denver Fire Clay Co.
Geophysical Inst. Co.
Pfaltz & Bauer, Inc.
Southwestern Electronics

ELLIPSOGRAPHS (See Drawing Instruments)

END MEASURES
Pratt & Whitney

ENGINE INDICATORS (See Indicators, Engine)

ENGINE INDICATOR REDUCING MOTION (See Reducing Motion, Engine Indicator)

EUDIOMETERS
Ace Glass Inc.
Central Scientific Co.
Eimer & Amend
Machlett & Son

EUSCOPES
Bausch & Lomb Optical

EXPANSION TEST APPARATUS (See Testers, Expansion)

EXTENSOMETERS
American Inst. Co.
Baldwin Southwark Corp.
Cambridge Inst. Co.
Ferner Co.
Hayes Scientific Apps.
Holz, Herman A.
Olsen Testing Machine

EYEGLASSES, POLARIZED (for Photoelastic Work or Strain Observation, etc.)
Polarizing Inst. Co.
Zeiss, Inc., Carl

FADE-OMETER
American Inst. Co.
Atlas Elec. Devices Co.
Central Scientific Co.
Pfaltz & Bauer, Inc.
Gen. Elec. Vapor Lamp
Saxl Inst. Co.

FAULT LOCATORS
Industrial Insts. Inc.
Leeds & Northrup
Rawson Elec. Inst. Co.
Rubicon Co.
Shallcross Mfg. Co.
Tobe Deutschmann Corp.

FEED WATER METERS
Bailey Meter Co.
Brown Inst. Co.
Builders Iron Foundry
Central Station Steam
Cochrane Corp.
Elec. Indicator Co.
Fischer & Porter
Heuszey Co.
Mason-Neilan Regulator
Morey & Jones, Ltd.
Republic Flow Meters
Tagliabue Mfg. Co.

FEED WATER TESTING APPARATUS
Allis Chalmers Mfg. Co.
Central Scientific Co.
Cochrane Corp.
Electronic Products Co.
Elgin Softener Corp.
G. M. Mfg. Co., Inc.
Hellige, Inc.
Industrial Insts. Inc.
LaMotte Chemical Prod.
Leeds & Northrup Co.
Pfaltz & Bauer, Inc.
Taylor & Co., Inc., W. A.

FIELD RHEOSTATS (See Rheostats, Field)

FIELD-STRENGTH MEASURING SETS
Andrew, Victor J.
Ferris Inst. Corp.
McFarlin Co.
RCA Manufacturing Co.
Tobe Deutschmann Corp.

FILLING MACHINES, Automatic
Anderson Bros. Mfg. Co.
Bowser, S. Co.
Gump Co., B. F.
Richardson Scale Co.
Sutton Company
Triangle Package Mach.

FILLING MACHINES, Bag
Gump Co., B. F.
Richardson Scale Co.
Sutton Company
Triangle Package Mach.

FILLING MACHINES, Barrel
Bowser, S. Co.

FILLING MACHINES, Can
Anderson Bros. Mfg.
Bowser, S. Co.
Gump Co., B. F.
Triangle Package Mach.

FILLING MACHINES, Carton
Gump Co., B. F.
Triangle Package Mach.

FILTERS, Light (See also Filters, Optical)
American Inst. Co.
Baird Associates
Black-Rock Lighting Co.
Central Scientific Co.
Corning Glass Works
Fish-Schurman Co.
Fuess, Inc.
Kollmorgen Optical Co.
Leitz, Inc.
Perkin, Elmer & Moffitt
Zeiss, Inc., Carl

FILTERS, Optical
Akatos, Inc.
Bausch & Lomb Optical
Fecker, J. W.
General Scientific Corp.
Goerz Amer. Optical Co.
Kahl Mfg. Co.
Micro Instrument Co.
Pfaltz & Bauer, Inc.
Tocrite Instrument Co.
Tronnes Mfg. Co.
United Chromium Corp.

FINDEPS VALVE BOX
Geophysical Inst. Co.

FIRE CONTROL INSTRUMENTS, MILITARY & NAVAL
Elec. Indicator Co.
Fecker, J. W.
Kahl Co.
Kollmorgen Optical Co.
United Chromium Corp.

FIRING DISKS
Veritas Firing System

FLASH POINT TESTERS (See Testers, Flash Point)

FLASHERS, Neon Tube
Automatic Elec. Mfg. Co.
Bacharach Industrial Inst.
Paragon Electric Co.
Sangamo Electric Co.

FLATNESS TESTERS (See Testers, Flatness Light Wave)

FLATS, OPTICAL
Alt, Telescope Lens
Baird Associates
Bausch & Lomb Optical
Clark & Sons
Fecker, J. W.
Ferner Co.
Fish-Schurman Co.
Fuess, Inc.
Gaertner Scientific Corp.
Goerz Amer. Optical Co.

FLATS, OPTICAL (Cont'd.)
Kollmorgen Optical Co.
Master Optical Co.
Micro Instrument Co.
Perkin, Elmer & Moffitt
Scherr Co., Inc., George
Van Keuren Co.
Zeiss, Inc., Carl

FLATS, OPTICAL, Fused Quartz
Thermal Syndicate Ltd.

FLOWMETERS, Air
Am. Gas Furnace Co.
American Inst. Co.
American Meter Co.
Bacharach Industrial Inst.
Bailey Meter Co.
Brown Inst. Co.
Builders Iron Foundry
Clark Blast Meter
Cochrane Corp.
Commercial Engg. Labs.
Detroit Air Meter Co.
Fischer & Porter

FLOWMETERS, Air (Cont'd.)
Fish-Schurman Co.
Foxboro Co.
Friez & Sons
Heuszey Co.
Ill. Testing Labs.
Jensen Inst. Co.
Lambert Meter Co.
Mason-Neilan Regulator
Meriam Co.
Morey & Jones, Ltd.
New Jersey Meter Co.
Republic Flow Meters
Schutte & Koerting Co.
Scientific Glass Apparatus
Selas Company
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Victor Equipment Co.

FLOWMETERS, Area, Cone & Disk Type
Fischer & Porter
National Meter Co.

FLOWMETERS, Area, Cylinder & Piston Type
American Inst. Co.
Bowser, S. Co.
Brown Inst. Co.
Fischer & Porter
National Meter Co.
New Jersey Meter Co.

FLOWMETERS, Area, Free Float Type
Am. Gas Furnace Co.
Bysco Co.
Fischer & Porter
Hoke, Inc.
Schutte & Koerting Co.

FLOWMETERS, Area, Orifice & Plug Type
American Meter Co.
Bacharach Industrial Inst.
Brown Inst. Co.
Cochrane Corp.
Fischer & Porter
Mason-Neilan Regulator
Republic Flow Meters

FLOWMETERS, Blast
Bacharach Industrial Inst.
Bailey Meter Co.
Brown Inst. Co.
Clark Blast Meter

FLOWMETERS, Blast (Cont'd.)
Cochrane Corp.
Tagliabue Mfg. Co.

FLOWMETERS, Gas, Indicating
American Meter Co.
Bacharach Industrial Inst.
Bailey Meter Co.
Binckley, G. S.
Bysco Co.
Bristol Co.
Brown Inst. Co.
Cochrane Corp.
Commercial Engg. Labs.
Bysco Co.
Detroit Air Meter Co.
Eclipse Aviation
Elec. Indicator Corp.
Fischer & Porter
Fish-Schurman Co.
Foxboro Co.
Friez & Sons
Gas Appliance Specialties
Heuszey Co.
Hoke, Inc.
International Filter Co.

Continued on next page

For accurate measurement and control of

FLOW AND LIQUID LEVEL

IF YOU require instruments for indicating or controlling flow or liquid level, Taylor can serve you. The three types shown at right are examples of the complete line of Taylor Instruments available.

TAYLOR DIAL-TYPE FLOW INDICATORS, for liquids, or for gases or steam under constant pressure, are ideal where only momentary indication of rate of flow is required.

TAYLOR FLOW RECORDERS come in single-pen and two- and three-pen types. The single-pen type records rate of flow directly when square root charts are used, or differential pressure when uniformly graduated charts are used. It also measures gases and steam which are under constant pressure, or where the pressure is assumed to be constant. Two-pen and three-pen types for gases and steam are generally furnished with uniformly graduated charts having two scales—one for differential pressure and one for static pressure or temperature.

TAYLOR FULSCOPE FLOW CONTROLLERS offer many full-range sliding adjustments. Their identity in mechanism with Fulscope Temperature and Pressure Controllers makes it possible to standardize on one basic control mechanism.

TAYLOR LIQUID LEVEL INDICATORS, made in differential pressure and static pressure types, have silvered-metal dials with bold figures and graduations.

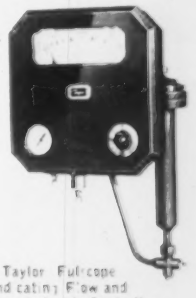
TAYLOR FULSCOPE LIQUID LEVEL CONTROLLERS are available in differential pressure, static pressure and internal and external float types.

TAYLOR LIQUID LEVEL RECORDERS are made in differential pressure types, applicable to either open or closed vessels, provided differential pressure is less than 200" of water, or the equivalent in other units of measurement. Special manometers can be supplied for greater ranges.

For full information, get in touch with the Taylor Representative or write for catalog. Taylor Instrument Companies, Rochester, New York. Plant also in Toronto, Canada.

Taylor Fulscope Recording Flow and Liquid Level Controller

Taylor Round Dial Flow Indicator



Taylor Fulscope Indicating Flow and Liquid Level Controller

Taylor

indicating · Recording · Controlling

TEMPERATURE, PRESSURE, FLOW and LEVEL INSTRUMENTS

FLOW METERS

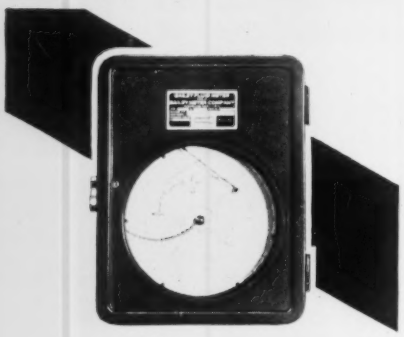
COMPACT, simplified flow meters of various types for accurately indicating, recording and totalizing fluid flow. For use with such primary devices as orifices, venturi tubes, pitot tubes, or venturi flumes and weirs.

Let us help solve your flow metering problems

Morey & Jones, Ltd.

Manufacturing Engineers

922 So. Hemlock St., Los Angeles, Calif.



BAILEY

Fluid Meters

For STEAM · LIQUIDS · GASES

● Bailey Fluid Meters are designed to indicate, record and integrate the flow of steam, liquids, or gases under practically any pressure or temperature condition.

A great variety of indicating, recording and integrating combinations are available for use with four distinct types of flow mechanisms.

This large variety of possible combinations enables the flow meter engineer to specify equipment which is pre-eminently suited to any flow measuring application.

When it is desired to place indicators, recorders and integrators at a considerable distance from the primary element, Bailey Synchro-Meters are available to provide electric transmission.

For detailed information consult Sweet's Engineering Catalogs or request a copy of bulletin No. 301.

BAILEY METER COMPANY

1041 IVANHOE ROAD · CLEVELAND, O.

Bailey Meter Company Ltd., Montreal, Canada

FLOWMETERS, Gas, Indicating (Cont'd)
Jerson Inst. Co.
Kollsman Inst. Co.
Lambert Meter Co.
Leeds & Northrup
Leupold, Voltmer & Co.
Mason-Neilan Regulator
Meriam Co.
Morey & Jones, Ltd.
National Meter Co.
New Jersey Meter Co.
Republic Flow Meters
Schantz & Koerting Co.
Selas Company
Sprague, Inc.
Tagliabue Mfg. Co.
Taylor Inst. Cos.

FLOWMETERS, Gas, Indicating & Recording (See Flow Meters, Gas, Indicating)

FLOWMETERS, Gas, Integrating & Recording (See Flow Meters, Gas, Indicating)

FLOWMETERS, Gas, Ring Balance
Cochrane Corp.

FLOWMETERS, Liquid (See Flow Meters, Gas, Indicating)

FLOWMETERS, Nozzle
Askania Regulator Co.
Bacharach Industrial Inst.
Bailey Meter Co.
Builders Iron Foundry
Brown Inst. Co.
Cochrane Corp.
Foxboro Co.
Mason-Neilan Regulator
Morey & Jones, Ltd.
Republic Flow Meters
Taylor Inst. Cos.

FLOWMETERS, Open-Stream
Bristol Co.
Cochrane Corp.
Mason-Neilan Regulator
Morey & Jones, Ltd.
Scientific Inst. Co., Calif.

FLOWMETERS, Orifice
Ace Glass Inc.
American Meter Co.
Askania Regulator Co.
Bacharach Industrial Inst.
Bailey Meter Co.
Builders Iron Foundry
Bristol Co.
Brown Inst. Co.
Builders Iron Foundry
Cochrane Corp.
Eimer & Amend
Foxboro Co.
Hoke, Inc.
Jerson Inst. Co.
Lambert Meter Co., Inc.
Leeds & Northrup Co.
Mason-Neilan Regulator
Meriam Co.
Morey & Jones, Ltd.
Pgh. Equitable Meter
Republic Flow Meters
Scientific Glass Apparatus
Tagliabue Mfg. Co.
Taylor Inst. Cos.

FLOWMETERS, Pitot Tube
Air Blower Corp.
American Meter Co.
Askania Regulator Co.
Bacharach Industrial Inst.
Brown Inst. Co.
Builders Iron Foundry
Cambridge Inst. Co.
Central Scientific Co.
Cochrane Corp.
Detroit Automatic Reg.
Detroit Air Meter Co.
Foxboro Co.
Friez & Sons
Fuess, Inc.
Kollsman Inst. Co.
Meriam Co.
Morey & Jones, Ltd.
Pitometer Log Corp.
Precision Therm. & Inst.
Refinery Supply Co.
Republic Flow Meters
Taylor Inst. Cos.

FLOWMETERS, Steam
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American Meter Co.
Bailey Meter Co.
Brown Inst. Co.
Bristol Co.
Cochrane Corp.
Foxboro Co.
Jerson Inst. Co.
Leeds & Northrup Co.
Mason-Neilan Regulator
Meriam Co.
Morey & Jones, Ltd.
Republic Flow Meters
Tagliabue Mfg. Co.
Taylor Inst. Cos.

FLOWMETERS, Vane
Autocall Co.
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Ill. Testing Labs.

FLOWMETERS, Venturi
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Mason-Neilan Regulator
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Taylor Inst. Cos.

FLUE GAS ANALYZERS (See Gas Analyzers, Flue Gas)

FLUID METER, GAS (See Gas Meters)

FLUID METERS, LIQUID (See Liquid Meters)

FLUID METERS, QUANTITY (See Meters, Current) (See Gas Meters) (See Liquid Meters)

FLUORESCENT CHEMICALS
Black-Ray Lighting Co.
Central Scientific Co.
Pfaltz & Bauer, Inc.
Patterson Screen Co.

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FLUXMETERS
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Central Scientific Co.
General Elec. Co.
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FOLDING ENDURANCE TESTERS (PAPER) (See Testers, Folding Endurance)

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Ford Motor Co.

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De Jur Amsco Corp.
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G-M Labs.
Interinstrumental Market
Loewenberg, F.
Luxtrol Co., Inc.
Pfaltz & Bauer, Inc.
United Cinephone Corp.
Weston Elec. Inst. Corp.

FOREWARN DETECTOR for locating hidden weapons (See Detectors, Metal)

FORKS, Synchronization
Elec. Tachometer Corp.
Gaertner Scientific Corp.
Riverbank Laboratories

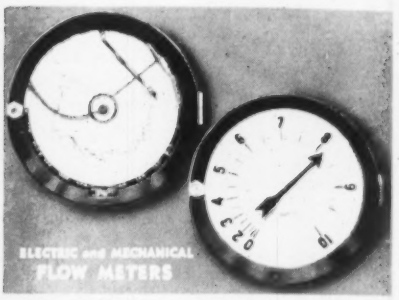
FORKS, Tuning
Clay-Adams Co.

FORKS, Tuning, Electrically Driven
Cambridge Inst. Co.
Central Scientific Co.
Chicago Apparatus Co.
Elec. Tachometer Corp.
Engineering Labs., Inc.
Gaertner Scientific Corp.
General Radio Co.
Riverbank Laboratories
Welch Mfg. Co.

FORKS, Vacuum Driven
Cambridge Inst. Co.
Gaertner Scientific Corp.
Riverbank Laboratories

FRACTIONAL HORSEPOWER MOTORS (See Motors, Fractional Horsepower)

FREENESS TESTERS (See Testers, Freeness)



For controlling, recording, totalizing and indicating the flow of fluids such as steam, water, gas, oil, etc.

Brown Flow Meters are available in two types: the Inductance Bridge Type (electric type) and Mechanical Type.

INDUCTANCE BRIDGE TYPE—Complete equipment consists of three units, the orifice plate, manometer and instrument. Instrument can be located at a remote point from the orifice and manometer (point of flow measurement).

Because of this flexibility, it is particularly adaptable for applications where instruments are to be remotely located for control purposes.

MECHANICAL TYPE—Complete equipment consists of two units, the orifice plate and the instrument. The meter body is integral with the instrument. Readings are transmitted mechanically from meter body to instrument.

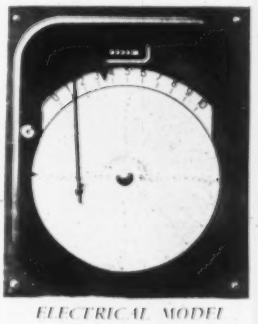
Write for Catalog 2005. THE BROWN INSTRUMENT COMPANY, *a division of Minneapolis-Honeywell Regulator Co.*, 4482 Wayne Avenue, Philadelphia, Pa.

BROWN FLOW METERS
AND
MINNEAPOLIS-HONEYWELL CONTROL SYSTEMS

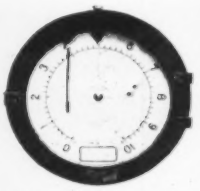
To Measure and Control is to Economize

ACCURATE CONTROL

Distinguished for extreme accuracy and high quality, Cochrane Flow Meters are reliable guides for compiling records of consumption, intake, output and variation in the rate of flow of steam, gases, water and other liquids. The Electric Model utilizes the galvanometer null principle.



ELECTRICAL MODEL



MECHANICAL MODEL

The sensitive galvanometer detects the slightest change in rate of fluid flow, unaffected by friction or variations in voltage or frequency. Can be installed any distance from pipe line. The mechanical model develops an extremely high torque, is accurate in design, simple and rugged in construction.

ORIFICE METERS AND TYPE E WEIR METERS

—have the same Cochrane accuracy and simplicity and are highly regarded by users for their particular applications.

Write for Publication Nos. 2092, 2094, 2096

COCHRANE CORPORATION

3120 N. 17th Street Philadelphia, Pa.

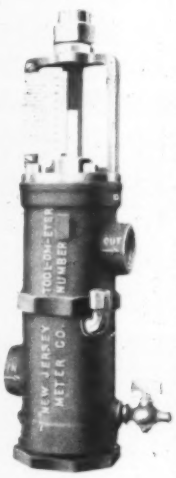
COCHRANE

FLOW METERS

For addresses, see pages 54-58

New Jersey Air Meters

TOOL-OM-ETER and DRILL-OM-ETER

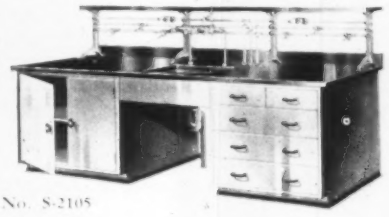


Measure the flow of Compressed Air to any process or tool. Guide the maintenance of pneumatic equipment in effective working condition.

These meters are of the constant head, variable orifice type, simple, reliable, portable, only one moving part. Used on air and other gases at 1-300 lb.

New Jersey Meter Co.
PLAINFIELD, N. J.

KEWAUNEE
Laboratory Wall Table



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Hagan Corp.
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Vortex Equipment Co.

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Laboratory Furniture Co.
Metal Furniture Works
Precise Instrument Co.
Sheldon & Co.
Simonds Co.
Southern Desk Co.
Welch Mfg. Co.

FUSES, INSTRUMENT
Executive Labs.
Meter Devices Co.

GAGE BLOCKS
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Pratt & Whitney
Van Keuren Co.

GAGE TESTERS, Deadweight
American Inst. Co.
Amthor Testing Inst. Co.
Ashton Valve Co.
Consol. Ashcroft Hancock
Crosby Steam Gage Co.
Holz, Herman A.
Olsen Testing Machine
Refinery Supply Co.
Stair Brass Mfg. Co.

GAGE TESTERS, Fluid-scale
Crosby Steam Gage Co.

GAGE TESTERS, Liquid-column
Consol. Ashcroft Hancock

GAGES (See also object of Measurement and control)

GAGES, Absolute Pressure
Bailey Meter Co.
Brockway, G. S.
Bristol Co.
Brown Inst. Co.
Consol. Ashcroft Hancock
Foxboro Co.
Kollsman Inst. Co.
Mason-Neilan Regulator
Moeller Instrument Co.
Precision Thermo. & Inst.
Scientific Inst. Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Uehling Instrument Co.
Vortex Equipment Co.

GAGES, Air
Ashton Valve Co.
Bailey Meter Co.
Bristian Blessing Co.
Bristol Co.
Consol. Ashcroft Hancock
Dezurik Sprinkler Co.
Foxboro Co.
Frez & Sons
Industrial Meter Co., Inc.
Marsh Co.
Mason-Neilan Regulator
Republic Flow Meters
Stair Brass Mfg.
U. S. Gage Co.
Vortex Equipment Co.

GAGES, Alarm
Ashton Valve Co.
Bailey Meter Co.
Bristol Co.
Consol. Ashcroft Hancock
Crosby Steam Gage
Foxboro Co.
Marsh Co.
Mason-Neilan Regulator
Precision Thermo. & Inst.
Stair Brass Mfg.
U. S. Gage Co.

GAGES, Amplifying
Cady-Wiley Tool Co.
Cincinnati Co.
Federal Prod. Corp.
North Side Tool Co.
Precision Gage & Tool
Saxl Inst. Co.
United Comptometer Corp.

GAGES, Bore
Brown & Sharpe
Cincinnati
Federal Prod. Corp.
Pratt & Whitney Co.
Scherr Co.
Sheffield Gage

GAGES, Bourdon
Ashcroft Valve Co.
Bailey Meter Co.
Bellows & Specialty Corp.
Bristian Blessing Co.
Bristol Co.
Brown Inst. Co.
Consol. Ashcroft Hancock
Crosby Steam Gage
Dezurik Co.
Ernst Co.
Foxboro Co.
Hays Corp.
Huke, Inc.
Industrial Gauge Mfg.
Mason-Neilan Regulator
Metercraft Corp.
Republic Flow Meters
Stair Brass Mfg. Co.
Taylor Inst. Cos.

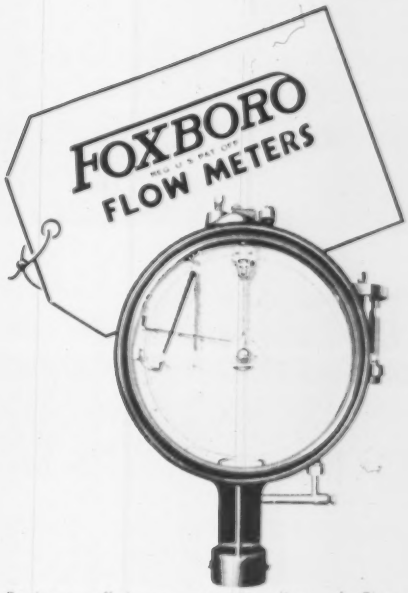
GAGES, Caliper (Dial)
Brown & Sharpe
Federal Prod. Corp.
Gilman & Co.
Scherr Co.

GAGES, Center
Moore Special Tool Co.
Scherr Co.
Union Tool Co.

GAGES, Comparator
Ames, B. C.
Cady-Wiley Tool Co.
Cincinnati Co.
Federal Prod. Corp.
Gaertner Scientific Corp.
Jones & Lamson Machine
North Side Tool Co.
Pratt & Whitney
Precision Gage & Tool
Saxl Inst. Co.
Scherr Co.
Sheffield Gage
United Comptometer Corp.

GAGES, Compression
Ashton Valve & Engr.
Bellows & Specialty Corp.
Bristol Inst. Co.
Saxl Inst. Co.
Riehle Bros. Testing Mach. Co.
Tinius Olsen Co.

GAGES, Cylinder
Ames, B. C.
Cady-Wiley Tool Co.
Cincinnati Co.
Federal Prod. Corp.
Pratt & Whitney
Scherr Co.
United Comptometer Corp.
Vortex Equipment Co.



Foxboro offers a complete line of Flow Meters for measuring steam, gas, air, oil, water, acids and other fluids. These meters are of the orifice type—simple in design, powerful, with a straight-line motion that assures permanent calibration and long life. They can be furnished with direct-reading integrator to give total flow. Recorders may also be equipped with pressure, temperature and integrator pens.

For complete information write for Bulletin No. 200-2 and Bulletin 692. The Foxboro Company, 46 Neponset Avenue, Foxboro, Mass., U.S.A. Branch offices in 25 Principal Cities.

MAINTAINING PROPER DRAFT is relatively a simple job once a Hays Draft Gage has been installed. Accurate measurements supplant guesswork, resulting in more efficient combustion.

HAYS ORIGINATED and perfected the dry or diaphragm type of draft gage and today Hays Draft Gages are standard equipment in thousands of the nation's boiler rooms.

HAYS DRAFT GAGES are offered in a wide variety of types from the V-type illustrated above, to recording gage. Send for our catalog today. Write to 925 Eighth Avenue, Michigan City, Indiana.

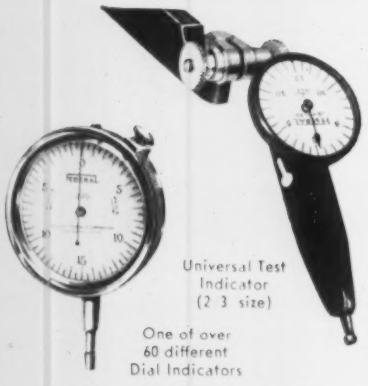
The HAYS CORPORATION
COMBUSTION INSTRUMENTS AND CONTROLS
MICHIGAN CITY, INDIANA, U.S.A.

For addresses, see pages 54-58

The Foxboro line includes Indicators, Recorders and Controllers in a variety of types to satisfy every condition which may be encountered. Liquids in both open and closed pressure vessels can be measured and controlled accurately.

Whatever your problem may be you will find a Foxboro Liquid Level Gauge exactly suited to your requirements. For complete information write for Bulletin No. 187. The Foxboro Company, 46 Neponset Avenue, Foxboro, Mass., U. S. A. Branch offices in 25 Principal Cities.

FEDERAL
DIAL INDICATORS



Universal Test Indicator (2 3 size)

One of over 60 different Dial Indicators

Most complete line available, graduated from .0 0025" to .005". Five sizes. FEDERAL Indicators are exceptionally accurate and durable.

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Brown & Sharpe
Glogau & Co.
Pratt & Whitney
Starrett Co.
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GAGES, Depth, Navigational
Geophysical Inst., Co.

GAGES, Dial, Machinists'
Ames Co., B. C.
Brown & Sharpe
Chicago Dial Ind.
Federal Prod. Corp.
Ferner Co.
Gendes, Andrew
Randall, Frank E.
Starrett Co.
Waltham Dial Gage

GAGES, Differential Pressure
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Scientific Glass Apparatus
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Tagliabue Mfg. Co.
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Uehling Instrument Co.
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GAGES, Draft (See Gages, Differential Pressure)

GAGES, Drill Grinding
Morse Twist Drill
Starrett, Co.

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Improved Gauge Mfg.
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Starrett Co.
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GAGES, Gas
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Bailey Meter Co.
Bastian-Blessing
Bristol Co.
Connelly Iron Sponge
Detroit Air Meter
Dickson Co.
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Mason-Neilan Regulator
Rochester Mfg. Co.
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Victor Equipment

GAGES, Grinding
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Brown & Sharpe
Comtor Co.
Federal Prod. Corp.

GAGES, Height
Brown & Sharpe
Ford Motor Co.
Scherr Co.
Starrett Co.

GAGES, Hook
Gurley, W. & L. E.
Scientific Inst. (Calif.)
White Co., Inc.

GAGES, Hydrostatic
Ashton Valve Co.
Bacharach Industrial Inst.
Crosby Steam Gage
King Seeley Corp.
Liquidometer Co.
Mason-Neilan Regulator
Star Brass Mfg.
Tagliabue Mfg. Co.

GAGES, Internal Dial
Coats Mach. Tool
Comtor Co.
Federal Prod. Corp.
Scherr Co.

GAGES, Limit
Ford Motor Co.
General Elec. Co.
Greenfield Tap & Die
Meldrum-Gabrielson
Pratt & Whitney
Sheffield Gage
United Chrysler
Van Keuren Co.

GAGES, Liquid Level, Indicating
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Ashcroft Co.
Bacharach Industrial Inst.
Bailey Meter Co.
Bastian Blessing
Binckley, G. S.
Bin-Dicator Co.
Boston Auto Gage
Bowser & Co.
Bristol Co.
Brown Inst. Co.
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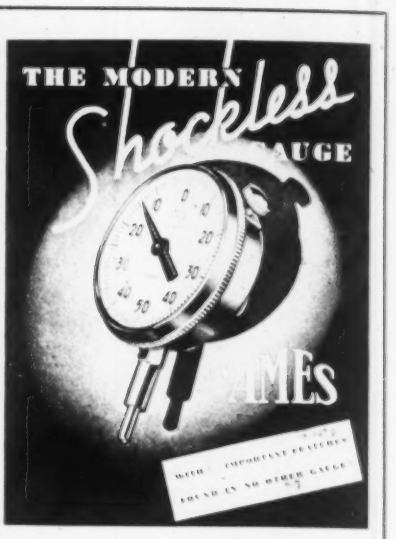
Star Brass Mfg.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Uehling Instrument Co.
Vapor Recovery Systems
Wallace & Tiernan
Westinghouse Elec. & Mfg.
Wheelco Inst. Co.
Williams Gauge Co.
Yarnell-Waring Co.

GAGES, Liquid Level, Recording (See Gages, Liquid Level, Indicating)

GAGES, Loss of Head
Bailey Meter Co.
Binckley, G. S.
Bristol Co.
Builders Iron Foundry
Foxboro Co.
International Filter Co.
Jensen Inst. Co.
Morey & Jones, Ltd.
Taylor Inst. Cos.

GAGES, Mercury
Bacharach Industrial Inst.
Bailey Meter Co.
Builders Iron Foundry
Central Scientific
Connelly Iron Sponge
Consol. Ashcroft Hancock
Defender Automatic Reg.
Dobrowin John
Dwyer Mfg. Co.
Eimer & Amend
Gas Appliance Specialties
General Physical Lab.
Jensen Inst. Co.
Machlett & Son
Mason-Neilan Regulator
Meriam Co.
Moeller Instrument
Morey & Jones
Precision Therm. & Inst.
Refinery Supp'y Co.
Scientific Glass Apparatus
Specialty Glass Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Uehling Instrument Co.

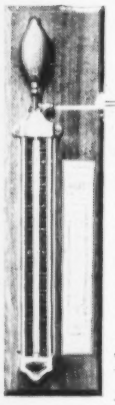
GAGES, Micrometer
Ames Co., B. C.
Brown & Sharpe
Central Scientific Co.
Coats Mach. Tool Co.
Gaertner Scientific Corp.
Haines Gauge Co.
Precision Therm. & Inst.
Scherr Co.
Van Keuren Co.
Millers Falls Co.
Zeiss, Inc., Carl



AMES Shockless Gauges

are steadily replacing less durable ones on measuring jobs where rough treatment is apt to damage the sensitive mechanisms. They accurately indicate the slightest size variations and have several other exclusive features besides the shock-absorber. Send for your copy of the bulletin describing them.

B. C. AMES COMPANY
WALTHAM, MASS.

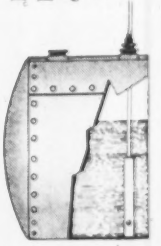


TANK GAUGE

PETROMETER

PETROMETER is an instrument for indicating at a remote location the depth of liquid in tanks. It may also be adapted to indicate gallonage or weight of liquids. Scales may be calibrated to read in any desired unit of measure or weight.

PETROMETER is used for all kinds of liquids, lighter or heavier than water, stored in any type of tank or container made of steel, glass, hard rubber, concrete or other kinds of materials.



PETROMETER CORP.
1 Star Square
LONG ISLAND CITY, N. Y.

For addresses, see pages 54-58

GAGES, Oil
Abercrombie Pump Co.
Bailey Meter Co.
Boston Auto Gage
Mason-Neilan Regulator
Nathan Mfg. Co.
Penberthy Injector Co.
Petrometer Corp.
Rochester Mfg. Co.
U. S. Gauge Co.

GAGES, Optical
Bausch & Lomb Optical
Chicago Dial Ind. Co.
Clark & Sons
Focker, J. W.
Gaertner Scientific Corp.
Jones & Lamson Machine
Scherr Co.
United Cinephone Corp.
Zeiss, Inc., Carl

GAGES, Paint Film
General Elec. Co.
Munsell Color Co.
Saxl Inst. Co.
Southern Electronics Labs.

GAGES, Paper Thickness
(See Gages, Thickness)

GAGES, Piston Ring
Holz, Herman
Wilkening Mfg. Co.

GAGES, Pitch Diameter
Brown & Sharpe
Federal Prod. Corp.
Greenfield Tap & Die
Pratt & Whitney
Scherr Co., Inc.
Union Tool Co.
Van Keuren Co.
West & Dodge Thr. Gage

GAGES, Plug
Brown & Sharpe
Ford Motor Co.
Greenfield Tap & Die
Morse Twist Drill
Pratt & Whitney
Precision Gage & Tool
Sheffield Gage
West & Dodge Thr. Gage

GAGES, Pneumatic Tank
Bayhatach Industrial
Mason-Neilan Regulator
Pneumercator Co.
Rochester Mfg. Co.

GAGES, Precision Measuring
Ames Co., B. C.
Brown & Sharpe
Contor Co.
Federal Prod. Corp.
Ferner Co.
Ford Motor Co.
Gaertner Scientific Corp.
Pratt & Whitney
Scherr Co., Inc.
Sheffield Gage
Starrett Co.
Thwing-Albert Inst. Co.
Van Keuren Co.
Carl Zeiss, Inc.

GAGES, Pressure, Indicating
Abercrombie Pump Co.
Allen Elec. & Equip.
American Meter Co.
Ashton Valve Co.
Bacharach Industrial Inst.
Bailey Meter Co.
Baird Associates
Baldwin Southwark Corp.
Bastian-Blessing
Bellfield Co.
Bickel & Co.
Bristol Co.
Brown Inst. Co.
Brush Development Co.
Central Scientific Co.
Clark Blast Meter
Commercial Eng. Labs.
Consol. Ashcroft Hancock
Continental Elec. Co.
Crew Equip. Co.
Crosby Steam Gage
Defender Automatic Reg.
Dickson Co.
Dubrovin, John
Eimer & Amend
Emery Co.
Esterline-Angus Co.
Fisher Scientific Co.
Foxboro Co.
Friez & Sons
Gas Appliance Specialties
General Elec. Co.
General Physical Lab.
Green, Henry J.
Halpern, Walter J.
Hays Corp.
Hoke, Inc.
Industrial Instrument Co.
Jerguson Gage Co.
King-Seeley Corp.
Kollsman Inst. Co.
Kurman Electric Co.
Leeds & Northrup
Leupold, Volpel & Co.
Linde Air Products Co.
Marsh Corp.
Mason-Neilan Regulator
Mercoid Corp.
Meriam Co.
Moeller Instrument Co.
Pittsburgh Equitable Met
Precision Gage & Tool

GAGES, Pressure, Indicating (Cont'd)
Precision Therm. & Inst.
Preferred Utilities Mfg.
RCA Manufacturing Co.
Refinery Supply Co.
Republic Flow Meters
Rochester Mfg. Co.
Scientific Inst. Co.
Star Brass Mfg. Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Thrush & Co., H. A.
Trattle Co.
Uehling Instrument Co.
United Chemicals Corp.
U. S. Gauge Co.
Victor Equipment Co.
Wagner & Son, Carl H.
Welch Mfg. Co.
Wilgus Manufacturing

GAGES, Pressure—Recording (See Gages, Pressure, Indicating)

GAGES, Pressure Temperature (See Gages, Pressure Indicating)

GAGES, Pressure, Tire
U. S. Gauge Co.

GAGES, Pressure & Vacuum (See Gages, Pressure Indicating)

GAGES, Profile
Pratt & Whitney
Precision Gage & Tool
Sheffield Gage
Stockton Profile Gage
United Cinephone Corp.

GAGES, Radius
Starrett Co.
United Cinephone Corp.

GAGES, Rain (See Rain Gages)

GAGES, Rifle Bore
Pratt & Whitney

GAGES, Ring
Brown & Sharpe
Greenfield Tap & Die
Morse Twist Drill
Pratt & Whitney
Precision Gage & Tool
Sheffield Gage
West & Dodge Thread
Zeiss, Inc., Carl

GAGES, Screw Thread
Brown & Sharpe
Federal Prod. Corp.
Greenfield Tap & Die
Millers Falls Co.
Pratt & Whitney
Reed Smyth Tool Works
Sheffield Gage
Starrett Co.
Union Tool Co.
West & Dodge Thread
Zeiss, Inc., Carl

GAGES, Sliding
Pratt & Whitney
Van Keuren Co.

GAGES, Snap
Brown & Sharpe
Greenfield Tap & Die
Mehlrum-Gabelstein
Pratt & Whitney
Precision Gage & Tool
Sheffield Gage

GAGES, Spline
Brown & Sharpe
Pratt & Whitney
Precision Gage & Tool
Sheffield Gage

GAGES, Star
Pratt & Whitney

GAGES, Strain
American Inst. Co.
Baldwin-Southwark
Binckley, G. S.
General Elec. Co.
Holz, Herman A.
Olsen Testing Machine
Pratt & Whitney
Saxl Inst. Co.
Starrett Co.

GAGES, Surface
Ames Co., B. C.
Brown & Sharpe
Gonales, Andrew
Federal Prod. Corp.
Millers Falls Co.
Saxl Inst. Co.
Starrett Co.
Zeiss, Inc., Carl

GAGES, Taper
Brown & Sharpe
Federal Prod. Corp.
Precision Gage & Tool
Pratt & Whitney
Sheffield Gage
Starrett Co.

GAGES, Telescoping
Brown & Sharpe
Starrett Co.

GAGES, Thickness
American Askania Corp.
Ames Co., B. C.
Amthor Testing Inst. Co.
Brown & Sharpe
Federal Prod. Corp.
Ford Motor Co.
General Elec. Co.
Hl. Testing Labs.
Magnetic Gauge Co.
Pratt & Whitney
Precision Gage & Tool
Precision Therm. & Inst.
Randall, Frank E.
Millers Falls Co.
Pratt & Whitney
Saxl Inst. Co.
Sheffield Gage
Southern Electronics Labs.
Speed-I & Co.
Starrett Co.
Sorer, Alfred
Thwing-Albert Inst. Co.
Union Tool Co.
Van Keuren Co.
Waltham Dial Gage

GAGES, Thickness, Magnetic
American Inst. Co.
Commercial Eng. Labs.
General Elec. Co.
Hickok Elec. Inst. Co.

GAGES, Tide
American Inst. Co.
Ballauf Mfg. Co.
Binckley, G. S.
Uehling Instrument Co.

GAGES, Torque
Manning, Maxwell & Moore
Riehle Div.
Saxl Inst. Co.
Toledo Scale Co.

GAGES, Vacuum
(See Gages, Pressure)

GAGES, Venturi (See Flow Meters, Venturi)

GAGES, Water Level (See Gages, Liquid Level)

GAGES, Wind
American Inst. Co.
Detroit Air Meter
Friez & Sons
Fuess, Inc.
Green, Henry J.
Kurman Instrument Co.
Taylor Inst. Cos.

GAGES, Wire Measuring
Ames Co., B. C.
Brown & Sharpe
Federal Prod. Corp.
Greenfield Tap & Die
Pratt & Whitney
Starrett Co.

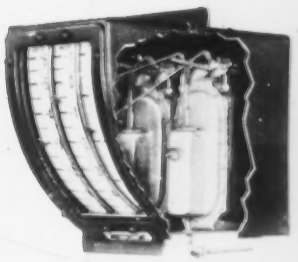
FEDERAL
DIAL GAUGES

Two point contact plug gauge, either hand or bench type.

DIAL GAUGES for checking diameters, depth, thickness, and sizes of machine parts. Most complete line of standard and special gauges. *Send for catalog.*

Caliper gauge for checking stock, castings, cores, glass bottles, etc.

FEDERAL PRODUCTS CORP.
1142 Eddy St., Providence, R. I.
Detroit—Chicago—Cleveland—New York



BAILEY MULTI-POINTER GAGES

● Bailey Multi-Pointer Gages are made with any number of pointers and any scale combination from one to twelve. The pointers have 10° motion over plainly marked plastic molded scales so that readings can be taken at a distance of 20 feet. Diaphragm actuated elements enable this gage to withstand over-drafts and over pressures without injury to the unit or its calibration.

All secondary factors such as draft, pressure, temperature, stoker speed and pulverizer feed can be indicated on one Bailey Multi-Pointer Gage.

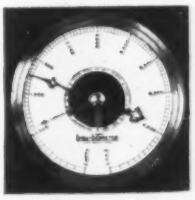
BAILEY METER COMPANY
1041 IVANHOE ROAD · CLEVELAND, O.
Bailey Meter Company Ltd., Montreal, Canada

TRU-VAC
Pirani type vacuum gauges
AC AND DC OPERATED

Our latest Model No. 20 is an AC operated gauge that will start and stop your pumping equipment at predetermined pressures.

Your inquiry invited.

CONTINENTAL ELECTRIC CO.
GENEVA, ILLINOIS



LIQUIDOMETER SENIOR

TANK CONTENTS GAUGES
FOR ANY LIQUID THAT FLOWS

LIQUIDOMETERS
100% automatic in operation. Liquid level changes instantaneously indicated or recorded without using outside source of power. Remote Reading models utilize an ingenious temperature compensated hydraulic transmission system, permitting long lengths of transmission tubing exposed to varying outdoor temperatures. All Liquidometers are float operated, eliminating use of pumps, valves, etc. and errors due to specific gravity differences.

LEVELOMETERS
Utilize hydrostatic principle of establishing a balance between the head of the liquid in a tank to be measured and the indicator located at a remote point. Dial type indication with large easy to read numerals and graduations. Precision built with knife edge bearings, they are rugged, easy to install and constructed of the finest materials.

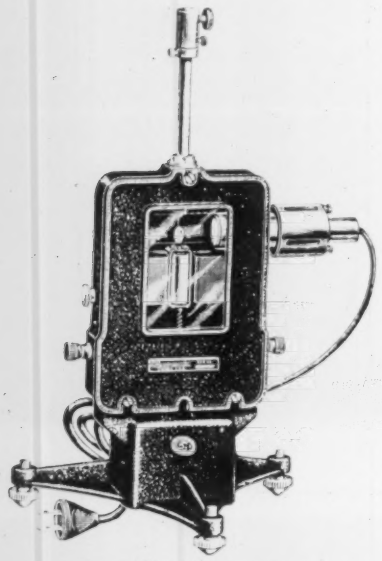
Liquidometers and Levelometers are made in a variety of sizes both in indicating or recording types to suit any depth of tank or capacity.

Write for literature

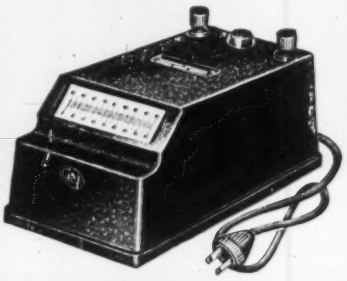
THE LIQUIDOMETER CORP.
36-28 SKILLMAN AVE., LONG ISLAND CITY, N. J.

For addresses, see pages 54-58

D'Arsonval Galvanometers



Suspended Coil Galvanometer
Sensitivity: 0.0004 to 0.003 microamperes per millimeter, at 1 meter scale distance.



Mirror Type Galvanometer
Sensitivity: 0.02 to 0.20 microamperes per millimeter scale division.

Pointer Type Galvanometer
Sensitivity: 0.10 to 1.0 microamperes per millimeter scale division.

Suspended Coil Galvanometer

You are certain of precise accuracy when you use this G-M designed suspended coil D'Arsonval galvanometer.

You also gain these four special advantages: 1) A light source is mounted in the side of the case, as an integral part of the instrument. 2) A coil lock is provided for holding the coil firmly. This reduces the probability of broken suspensions when moving the instruments. 3) A micro-adjuster screw with ratio of 25 to 1 allows accurate positioning of the coil. 4) The angle of the mirror is adjustable in relation to the coil.

This galvanometer is housed in a machined, cast aluminum case. The coil circuit can be electrostatically shielded. The suspension tube is insulated from the case, permitting a ground connection to the case independent of the coil circuit.

Write for catalog giving characteristics, accessory apparatus, and prices.

Taut Suspension Galvanometer

In G-M designed taut suspension D'Arsonval galvanometers you secure twin benefits of accuracy, plus exceptional ruggedness.

These instruments have proved particularly suitable for severe service requirements in portable use, either in student or industrial laboratories. Both shock and impact tests prove the durability of the suspension system. High angular sensitivity is combined with large scale-angle. The instruments require no special care in leveling. The coil is damped to secure minimum reading time. The instrument is well balanced mechanically to provide uniform scale accuracy.

The scales of both pointer and mirror types are inclined at an angle of 45 degrees. Scales are numbered with double sets of figures, having zero positions at the center and to the left. A zero correction knob is provided. Normally adjusted to zero center reading, the instrument may be adjusted to zero left reading at the factory. Mirror type galvanometers are furnished with lamps.

Write for catalog giving characteristics, specifications, and prices.

Super Sensitive Relay

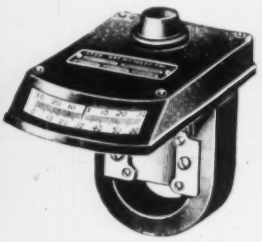
This G-M designed D'Arsonval relay is an exceptionally sensitive control instrument. The relay is of depressor bar, intermittent contacting type. Contact pressure is sufficient to control a one ampere load. The depressor bars are driven by a synchronous motor.

This relay has many control applications, such as for industrial processes, temperatures, illumination or automatic electric testing. It will also control power circuits. Write for catalog giving complete description.

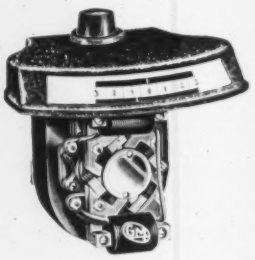
Panel Movements

Both pointer type galvanometers and super sensitive relays are provided for panel mounting. Each unit is a complete assembly. Send for the G-M catalog giving prices on these movements. The catalog contains the complete line of G-M instruments and accessory apparatus.

Super Sensitive Relay
Sensitivity: 0.125 to 1.25 microamperes per millimeter division.



Galvanometer Movement
Sensitivity: 0.10 to 1.0 microamperes per millimeter scale division.



Relay Movement
Sensitivity: 0.125 to 1.25 microamperes per millimeter division.

G-M LABORATORIES, INC.

DEPT. L 1731 BELMONT—CHICAGO, U. S. A.

ACCURATE TESTING UNITS!

BRUSH'S

CRYSTAL

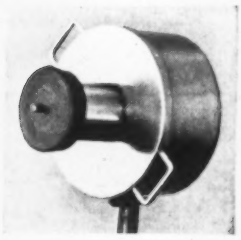
- galvanometers
- vibration pickups

Model OS-2B

For accurately studying and recording wave forms from high impedance drivers, Brush gives you its three types of crystal galvanometers, models OS-1B, OS-2B and OS-3B. Each unit is high capacitive impedance (over 20,000 ohms) and all are voltage operated devices. The OS-1B has uniform sensitivity from 1 - 1000 c.p.s., the OS-2B from 1 - 5000 c.p.s., and the OS-3B from 1 - 9000 c.p.s. This unit is especially applicable for sound-on-film recording, vibration recording and analysis, and geophysical work. Furnished with lens (focal length 10") as standard. Net price, all types . . $45.00.

Brush vibration pickups are valuable in locating the source of noise or vibration in motors, transformers, compressors and scores of mechanical devices. The Model VP-5 is an inertia type which delivers a voltage proportional to the acceleration it receives when applied to a vibrating body. Has no moving parts and can be recommended for frequencies up to 1500 cycles per second. Model VP-1 recommended for frequencies up to 10,000 cycles. Complete with 7½ ft. rubber covered (Neoprene, oil proof) shielded cable. Net price . . . $25.00.

Model VP-5



Model DP-1

The Brush Model DP-1 is a displacement type pickup designed for low frequency work. Response flat from 1 to 600 c.p.s. Will reproduce all frequencies up to 7,000 c.p.s. Vibration axis parallel with axis of pin. Complete with 6 ft. of Neoprene rubber shielded cable. Net price . . . $47.50.

BRUSH DEVELOPMENT CO.

3331 PERKINS AVE. BRUSH PIEZO ELECTRIC DEVICES CLEVELAND, OHIO

GALVANOMETERS, A-c
Brown Inst. Co.
Brush Development Co.
Cambridge Inst. Co.
Central Scientific Co.
General Elec. Co.
Holland Research Corp.
Leeds & Northrup Co.
Pfaltz & Bauer, Inc.
Rawson Electrical Inst.
Rubicon Co.
Ruska & Co.
Sensitive Research Inst.
Welch Mfg. Co.
Weston Elec. Inst.
Wheelco Inst. Co.

GALVANOMETERS, Astatic
Cambridge Inst. Co.
Central Scientific Co.
Chicago Apparatus Co.
Leeds & Northrup Co.
Precise Instrument Co.
Rawson Electrical Inst.
Sensitive Research Inst.
Wheelco Inst. Co.

GALVANOMETERS, D-c
Brown Inst. Co.
Cambridge Inst. Co.
Central Scientific Co.
Chicago Apparatus Co.
General Elec. Co.
G-M Labs.
Hickok Elect. Inst. Co.
Leeds & Northrup Co.
Pfaltz & Bauer, Inc.
Rawson Electrical Inst.
RCA Manufacturing Co.
Ruller-Smith Co.
Rubicon Co.
Sensitive Research Inst.
Shallcross Mfg. Co.
Simpson Elec. Co.
Tagliabue Mfg. Co.
Trip.ett Electrical Inst.
W. M. Welch Mfg. Co.
Weston Elec. Inst. Corp.
Wheelco Inst. Co.

GALVANOMETERS, Piezoelectric
Brush Development Co.

GALVANOSCOPE
Central Scientific Co.

GAS ANALYZERS, Air
Cambridge Inst. Co.
Central Scientific Co.
Eimer & Amend
Fish-Schurman Co.
Fisher Scientific Co.
Friez & Sons
Hesler Co.
Mercoid Corp.
Mine Safety Appliances
Permutit Co.
Sargent & Co.
Scientific Glass App.
Tagliabue Mfg. Co.
Wilson Products, Inc.

GAS ANALYZERS, Ammonia
Cambridge Inst. Co.
Engelhard, Chas.
Mercoid Corp.
Permutit Co.
Sargent & Co.
Tagliabue Mfg. Co.

GAS ANALYZERS, Carbon Dioxide
Arthur Glass Inc.
Allen Elec. & Equip.
Bachrach Industrial Inst.
Brown Inst. Co.
Cambridge Inst. Co.
Central Scientific Co.
Detroit Automatic Reg.
Dwyer Mfg. Co.
Eimer & Amend
Ellison Draft Gage Co.
Engelhard, Chas.
Fish-Schurman Co.
Fisher Scientific Co.
Friez & Sons
Gow-Mac Instrument
Hays Corp.
Hesler Co.
Lantz Phelps Corp.
Leeds & Northrup Co.
Machlett & Son
Permutit Co.
Potter Co.
Precision Therm. & Inst.
Preferred Utilities Mfg.
Republic Flow Meters
Sargent & Co.
Scientific Glass App.
Scientific Inst. Co.
Tagliabue Mfg. Co.
Uehling Instrument Co.
Williams Apparatus Co.

GAS ANALYZERS, Carbon Monoxide
Allen Elec. & Equip.
Bachrach Industrial Inst.
Cambridge Inst. Co.
Chicago Apparatus Co.
Eclipse Aviation
Eimer & Amend
Fish-Schurman Co.
Hays Corp.
Leeds & Northrup Co.
Machlett & Son

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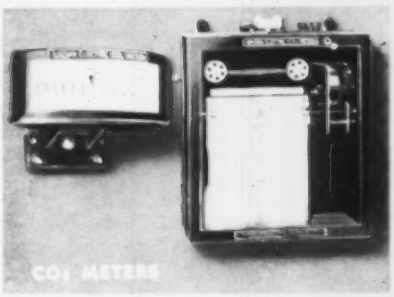


For Recording and Indicating the Per Cent CO_2 in Flue Gas

Analyzes the flue gases electrically and then transmits the readings electrically to an indicating or recording meter, or both. No moving parts or chemicals in the gas analysis cell.

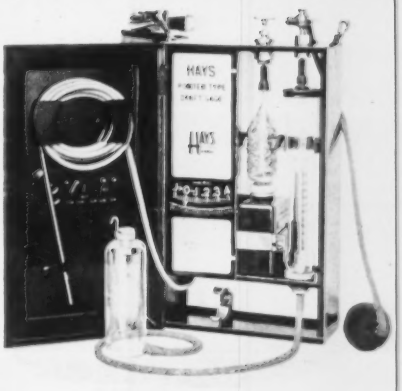
Furnished in three types for recording from one to six readings on a single chart, 7" wide. Single point recorders record the per cent CO_2 on a full width chart, using an inked ribbon. Multiple models record from two to four CO_2 readings on a full width chart using a multi-colored ribbon. Multiple duplex models record from two to six readings on two sections of a full width chart, using two measuring systems and two multi-colored inked ribbons. Flue gas temperature can be recorded on same duplex chart with CO_2 reading. One, two or three temperatures and CO_2 readings can be recorded on the same duplex chart. Indicating reading is obtained directly on a 6" scale.

Write for Catalog 3005. THE BROWN INSTRUMENT COMPANY, *a division of Minneapolis-Honeywell Regulator Co.*, 4482 Wayne Avenue, Philadelphia, Pa.

BROWN ELECTRIC CO_2 METER AND MINNEAPOLIS-HONEYWELL CONTROL SYSTEMS

To Measure and Control is to Economize

A LABORATORY JOB DONE IN THE FIELD



HAYS PORTABLE COMBUSTION TEST SETS are equipped to handle an accurate gas analysis—right in the field.

Installations become more successful, trouble makers are rapidly exposed, guesswork becomes a thing of the past.

Test Sets are available with all necessary equipment for the analysis for CO_2, CO, and O_2—complete with flue gas thermometer, and draft gage. For further particulars—write to 925 Eighth Avenue, Michigan City, Indiana.

THE HAYS CORPORATION
COMBUSTION INSTRUMENTS AND CONTROLS
MICHIGAN CITY, INDIANA, U.S.A.

For addresses, see pages 54-58

GAS ANALYSIS

Solves Many Problems

The Engelhard Thermal Conductivity Method of Gas Analysis has enabled many plants to control operations closely. It has resulted in products consistently uniform at a considerable saving in time and money.

You can analyze—for example:

Hydrogen	**Argon**
Carbon Dioxide	**Nitrous Oxide**
Sulphur Dioxide	**Acetone**
Ammonia	**Helium**

We shall be glad to consider special problems.

SEND FOR LITERATURE

Charles Engelhard, Inc.

90 Chestnut St. Newark, N. J.

Manufacturers of Pyrometers, Resistance Thermometers, Combustion Indicators, Exhaust Gas Analysers, Flue Gas Analysers, Thermocouples

GOW-MAC

AIR FUEL RATIO and CO_2 METERS

FOR COMBUSTION EFFICIENCY

in furnace and engine on road or in shop

FOR QUALITY CONTROL

in industry where CO or hydrogen are used

FOR SAFETY

in maintaining inert gases at standards of normal or reducing atmospheres

GOW-MAC INSTRUMENT COMPANY

20 Washington Pl. Newark, N. J.

GAS ANALYZERS, Carbon Monoxide (Cont'd)
Mine Safety Appliances
Sargent & Co.
Scientific Glass App.
Scientific Inst. Co.
Tagliabue Mfg. Co.

GAS ANALYZERS, Chlorinated Hydrocarbons
Wilson Products, Inc.

GAS ANALYZERS, Flue Gas (See Gas Analyzers, Carbon Dioxide)

GAS ANALYZERS, Hydrogen
Bacharach Industrial Inst.
Chicago Apparatus Co.

GAS ANALYZERS, Hydrogen Sulphide
American Meter
Brown Inst. Co.
Bushnell, R. O.
Cambridge Inst. Co.
Connelly Iron Sponge
Eimer & Amend
Mine Safety Appliances
Sargent & Co.
Scientific Glass Apparatus

GAS ANALYZERS, Nitric Oxide
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Eimer & Amend
Rubicon Co.
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GAS ANALYZERS, Orsat
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GAS METERS, INFERENTIAL — Area (See Flowmeters, Area)

GAS METERS, INFERENTIAL — Flownozzle (See Flowmeters, Nozzle)

GAS METERS, INFERENTIAL—Orifice (See Flowmeters, Orifice)

GAS METERS, INFERENTIAL — Pitot-tube (See Flowmeters, Pitot-tube)

GAS METERS, INFERENTIAL—Venturi (See Flowmeters, Venturi)

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GAS METERS, POSITIVE, Rotary
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GAS METERS, POSITIVE, Special for extremely small flows
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GAS METERS, POSITIVE Wet-drum
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Central Scientific Co.
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GAS & VAPOR DISCHARGE TUBES, Neon
Barkon Frink
Central Scientific Co.
Gen. Elec. Vapor Lamp
General Physical Lab.
Machlett & Son

GAS & VAPOR DISCHARGE TUBES, Nitrogen
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General Physical Lab.

GAS & VAPOR DISCHARGE TUBES, Sodium
Central Scientific Co.
Gen. Elec. Vapor Lamp

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Heiland Research Corp.
Meco Instrument Co.
Roska & Co., Inc.
Sensitive Research Inst.

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GLARE METER
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Central Scientific Co.
Gaertner Scientific Corp.
Saxl Inst. Co.

GLASS STRAIN TESTERS (See Testers & Testing Machines, Glass Strain)

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Fish-Schurman Co.
Kimble Glass Co.

GLASS TUBING, Ultra-Violet Transmitting
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Fish-Schurman Co.
General Elec. Co.

GLASS TUBING, Ultra-Violet Transmitting Opaque to Visible
Black-Ray Lighting
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Fish-Schurman Co.
General Elec. Co.

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Central Scientific Co.
Gaertner Scientific Corp.
Pfaltz & Bauer, Inc.
Saxl Inst. Co.
Sensitive Research Inst.
Suter, Alfred
Zeiss, Inc., Carl

GONIOMETER
Automatic Temp. Control
Fuess, Inc.
Hayes Scientific App.
Zeiss, Inc., Carl

GOVERNORS (See also object of measurement and control)

GOVERNORS, Air (See Regulators, Automatic, Air)

GOVERNORS, District
American Meter Co.
Connelly Iron Sponge
Pittsburgh Equit. Meter

GOVERNORS, Engine
Cash Co.
Hanlon-Waters, Inc.
Judson Governor Co.
Mason-Neilan Regulator
Pittsburgh Equit. Meter

GOVERNORS, Gas (See Regulators, Automatic, Air)

GOVERNORS, Hydraulic
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Cash Co.
Hagan Corp.
Hanlon-Waters, Inc.
Schade Valve Mfg.
Tagliabue Mfg. Co.

GOVERNORS, Liquid Level (See Controllers, Automatic, Liquid Level)

GOVERNORS, Pressure (See Regulators, Automatic, Air)

GOVERNORS, Pump (See Regulators, Automatic, Air)

GOVERNORS, Station
Connelly Iron Sponge

GOVERNORS, Steam (Regulators, Automatic, Air)

GOVERNORS, Turbine
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Hagan Corp.
Mason-Neilan Regulator

GRADUATING MACHINES (See Dividing Machines)

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GRAPHIC (See object of measurement and control)

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Eimer & Amend
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Stiefel & Co.

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HARDNESS TESTER (See Testers & Testing Machines, Hardness)

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Raytheon Mfg. Co.
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HORIZONS, ARTIFICIAL (See Artificial Horizons)

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HUMIDITY INSTRUMENTS, Aspiration Psychrometric (See Psychrometers, Aspiration)

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Industrial Inst., Inc.

HUMIDITY INSTRUMENTS, Hygrometric (See Hygrometers)

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Machlett & Son
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Scientific Glass Apparatus
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Huddleston, J. S. F.
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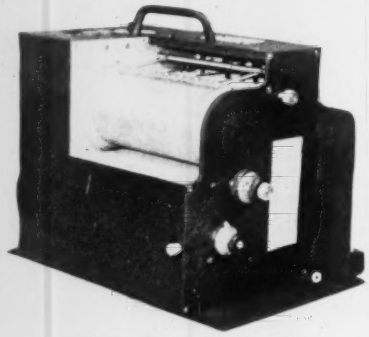

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Spencer Lens Co.
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LENSES, Photographic
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LENSES, Reading
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Fuess, Inc.
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LENSES, Special
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Gurley, W. & J. E.
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Ruehfel Co.
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White Co., Inc., David

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LEVELS, Engineer's (See Surveying Instruments)

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Keuffel & Esser Co.
Leupold, Voltzel & Co.
Scherr Co., Inc.
Starrett Co.
Warren Knight Co.
White Co., Inc., David
Zeiss, Inc., Carl

LEVELS, Prism
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Kern Co.
Keuffel & Esser Co.
Taylor Inst. Cos.
White Co., Inc., David

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LEVELS, Wye (See Surveying Instruments)

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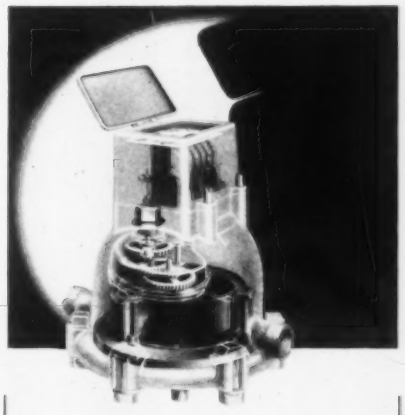

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Frober-Faybor Co.
General Elec. Co.
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General Physical Lab.

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Gaertner Scientific Co.
General Elec. Co.
General Physical Lab.
G-M Labs.
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Luxtrol Co., Inc.
United Cinephone Corp.

LIGHT SOURCES, Mercury Vapor
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Gaertner Scientific Corp.
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Misco Instrument Co.
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Central Scientific Co.
Fish-Schurman Co.
Fuess, Inc.
Gaertner Scientific Corp.
Gen. Elec. Vapor Lamp
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Pfaltz & Bauer, Inc.
Polarizing Instrument
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LIGHT SOURCES, Neon
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LIGHT SOURCES, Sodium
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Central Scientific Co.
Gaertner Scientific Corp.
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Pfaltz & Bauer, Inc.
United Cinephone Corp.
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LIGHT SOURCES, Ultra-Violet
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Gaertner Scientific Corp.
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General Physical Lab.
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LIGHT WAVE MEASURING EQUIPMENT
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Badger Meter Co.
National Meter Co.
Neptune Meter Co.
Pgh. Equitable Meter
Worthington Gamon Met.

LIQUID METERS, Volumetric Types, Nutating Piston
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LIQUID METERS, Volumetric Types, Oscillating Piston
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Campion Labs.
National Meter Co.
Neptune Meter Co.
Worthington Gamon Met.

LIQUID METERS, Volumetric Types, Reciprocating Piston
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Pgh. Equitable Meter

LIQUID METERS, Volumetric, Rotary Piston
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Bonset & Co.
National Meter Co.
Neptune Meter Co.
Pgh. Equitable Meter
Smith Meter Co.

LIQUID METERS, Volumetric Types, Special for extremely low flow
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Commercial Eng. Labs.
Fluid Meters, Inc.
McCord Radiator & Mfg.

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Brown Inst. Co.
Fisher Governor Co.
Friez & Sons
General Controls Co.
Hagan, Corp.
Hanlon-Waters, Inc.
Mason-Neilan Regulator
Natural Gas Equipment

LUMBER COUNTERS (See Counters, Lumber)

LUSTER METERS
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Leitz, Inc.
Saxl Inst. Co.
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MACHINIST'S SQUARES (See Squares, Machinist's)

MAGNETIC INSPECTORS (See Inspectors, Magnetic)

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Baird Associates
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Cambridge Inst. Co.
Geophysical Inst. Co.
Precise Instrument Co.
Welch Mfg. Co.

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Gregan & Co.
G. M. Mfg. Co., Inc.
Kreibel & Esser Co.
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Lincoln Optics
Seibel & Co.
Spencer Lens Co.
Taylor Instrument Co.
Warren Knight Co.
Zeiss, Inc., Carl

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MANOMETERS, High Pressure
Bethel Office Fitting

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Bailey Meter Co.
Consol. Asheroft Hancock
Detroit Air Meter Co.
Dwyer Mfg. Co.
Friez & Sons

MANOMETERS, Inclined Tube (Cont'd)
Fuess, Inc.
Hays Corp.
H-B Inst. Co., Inc.
Meriam Co.
Precision Therm. & Inst.

MANOMETERS, Micro
Bacharach Industrial Inst.
Cambridge Inst. Co.
Fuess, Inc.
Welch Mfg. Co.

MANOMETERS, Remote-reading
Bailey Meter Co.
Brown Inst. Co.

MANOMETERS, Single-tube & Reservoir
Ace Glass Inc.
Bacharach Industrial Inst.
Bailey Meter Co.
Commercial Engg. Labs.
Connelly Iron Sponge Co.
Detroit Automatic Reg.
Detroit Air Meter Co.
Dwyer Mfg. Co.
Gas Appliance Specialties
Lantz Phelps Corp.
Meriam Co.
Morey & Jones, Ltd.
Precision Therm. & Inst.
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Bailey Meter Co.
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Southern Electronics Labs.

Bacharach Industrial Instrument Co.
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FOR INDUSTRIAL AND LABORATORY USE. REQUEST BULLETIN 135

For addresses, see pages 34-58

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Bacharach Industrial Inst.
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Connelly Iron Sponge
Consol. Ashcroft Hancock
Detroit Automatic Reg.
Detroit Air Meter Co.
Dixie Mfg. Co.
Eimer & Amend
Fish-Schurman Co.
Foxboro Co.
Hagan, Walter J.
Hays Corp.
Ivanoe Inst. Co.
Kimble Glass Co.
Lambert Meter Co.
Macalaster Bicknell Co.
Machlett & Son
Meriam Co.
Mine Safety Appliances
Moeller Instrument Co.
Morey & Jones, Ltd.
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Reeder & Betzold
Refinery Supply Co.
Rolfe Glass Division
Scientific Inst. Co.
Specialty Glass Co.
Tagliabue Mfg. Co.
Vapor Recovery Systems
Wilkins-Anderson Co.

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Connelly Iron Sponge
Mason-Neilan Regulator
Precision Therm. & Inst.
Scientific Inst. Co.
Taylor Inst. Cos.

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MARINE INSTRUMENTS, Gyro-Compass & Gyro-Pilot
Sperry Gyroscope Co.

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MEASURING MACHINES, Lineal
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Ferner Co.
Fidelity Mach. Co.
Gaertner Scientific Corp.
Pratt & Whitney

MEASURING MACHINES, Wire
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Minneapolis Elec. & Const.
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Biddle Co., Jas. G.
Cambridge Inst. Co.
Clough-Brengle Co.
General Elec. Co.
General Radio Co.
Ill. Testing Labs.
Industrial Instruments
Martindale Electric Co.
Rawson Electrical Inst.
RCA Manufacturing Co.
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Shallcross Mfg. Co.
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Southw'n Electronics Labs.
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Western Machinery Co.

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METALLIC BELLOWS (See Bellows, Metallic)

METALS, Thermostatic
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General Plate

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American Inst. Co.
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Friez & Sons

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Geophysical Instrument
G. M. Mfg. Co., Inc.
Green, Henry J.
Moeller Instrument Co.
Precision Therm. & Inst.
Taylor Inst. Cos.

METER PROVERS, Gas
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Lambert Meter Co.
Pgh. Equitable Meter Co.

METERS, Acid (See Acidimeters)

METERS, Ampere Hour (See Ampere Hour Meters)

METERS, Coal (See Coal Meters)

METERS, Compressed Air
American Meter Co.
Bailey Meter Co.
Mason-Neilan Regulator
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Taylor Inst. Cos.

METERS, Condensation
Am. Dist. Steam Co.
Bailey Meter Co.
Buffalo Meter Co.
Central Station Steam
Henszey Co.
Taylor Inst. Cos.

METERS, Conductivity (See Conductivity Meters)

METERS, Consumer's, Electric
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Westinghouse Elec. & Mfg.

METERS, Consumer's, Gas
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Lambert Meter Co., Inc.

METERS, Current, Air & Gas
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Mason-Neilan Regulator
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Bowser & Co.
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Neptune Meter Co.
Pgh. Equitable Meter Co.
Scientific Inst. Co. (Calif.)
Uehling Instrument Co.
Worthington Gamon Meter

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METERS, Demand, Electric
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Hot Elec. Co.
Landis & Gyr, Inc.
Lincoln Meter Co.
Sangamo Electric Co.
Westinghouse Elec. & Mfg.

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Bailey Meter Co.
Bendix Marine Products
Lambert Meter Co.
Mason-Neilan Regulator
Pgh. Equitable Meter Co.

METERS, Demand Limiting
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Amis Co.
General Elec. Co.
Landis & Gyr, Inc.
Lincoln Meter Co.
Mason-Neilan Regulator
Westinghouse Elec. & Mfg.

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Geophysical Inst. Co.
Rawson Electrical Inst.
Southw'n Electronics Labs.

METERS, Electronic
Ballantine Labs.
Cambridge Inst. Co.
Clough-Brengle Co.
Luxtrol Co., Inc.
RCA Manufacturing Co.
Southw'n Electronics Labs.

METERS, Flow (See Flowmeters)

METERS, Footage (See Counters, Footage)

METERS, Foot-candle (See Foot-candle Meters)

METERS, Frequency (See Frequency Meters)

METERS, Gas (See Gas Meters)

METERS, Gas-Dry Test
American Meter Co.
Lambert Meter Co.
Pgh. Equitable Meter Co.
Tagliabue Mfg. Co.

METERS, Gas-Integrating
American Meter Co.
Bailey Meter Co.
Brown Inst. Co.
Foxboro Co.
Lambert Meter Co.
Mason-Neilan Regulator
Tagliabue Mfg. Co.
Taylor Inst. Cos.

METERS, Gas-Wet Test
American Meter Co.
Lambert Meter Co.
Tagliabue Mfg. Co.

METERS, Gasoline (See Liquid Meters)

METERS, Gas, Station
Bowser & Co.
Pgh. Equitable Meter Co.

METERS, High Pressure & High Pressure Distribution
Pgh. Equitable Meter Co.

METERS, Hydrogen Ion (See Testers, Hydrogen Ion)

METERS, Mileage
Gauthier, Donat A.
Jaeger Watch Co.
Ohmer Register
Veeder-Root, Inc.

METERS, Multi-Rate
Landis & Gyr, Inc.

METERS, Oil (See Liquid Meters)

METERS, Orifice (See Flowmeters, Orifice)

METERS, Oxygen
American Meter Co.
Bailey Meter Co.
Brown Inst. Co.
Pgh. Equitable Meter Co.

METERS, Pitot Tube (See Flowmeters, Pitot Tube)

METERS, Positive Displacement (See Gas Meters, Positive and Liquid Meters, Volumetric)

METERS, Prepayment
American Meter Co.
Landis & Gyr, Inc.

METERS, Proportional
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Bristol Co.
Mason-Neilan Regulator
National Meter Co.
Pgh. Equitable Meter Co.
Taylor Inst. Cos.

METERS, Reactive Component
Andrew, Victor J.
General Elec. Co.
Landis & Gyr, Inc.
Westinghouse Elec. & Mfg.

METERS, Rotary Displacement
Bowser & Co.
Neptune Meter Co.
Pgh. Equitable Meter Co.

METERS, Sewage
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Bailey Meter Co.
Brown Inst. Co.
Builders Iron Foundry
Mason-Neilan Regulator
Morey & Jones, Ltd.
Pgh. Equitable Meter Co.
Taylor Inst. Cos.

METERS, Shunt
Builders Iron Foundry
Columbia Elec. Mfg.
Daven Co.
Rawson Electrical Inst.
Wheelco Inst. Co.

METERS, Station
American Meter Co.

METERS, Steam (See Flowmeters, Steam)

METERS, Time
Campion Labs.
Cramer & Co., Inc.
Elec. Tachometer Corp.
General Elec. Co.
Jaeger Watch Co.
Lucas, J. Milton
National Instrument Co.
Paragon Electric Co.
Rawson Electrical Inst.
Tiffomson Clock Co.
Warren Telechron Co.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

METERS, Venturi (See Flowmeters, Venturi)

METERS, V-notch (See Flowmeters, Weir)

METERS, Volumetric, Positive Displacement (See Gas Meters, Positive see Liquid Meters, Volumetric)

METERS, Water (See Liquid Meters, Volumetric; also Flowmeters, Liquid)

METERS, Watt-Hour
Duncan Electric
General Elec. Co.
Landis & Gyr, Inc.
Sangamo Electric Co.
Westinghouse Elec. & Mfg.

METERS, Weir (See Flowmeters, Weir)

MICROAMMETERS (See Ammeters, Microammeters)

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Akatos, Inc.
Dietert Co.
Gaertner Scientific Corp.
Mico Instrument Co.

MICROFARADMETERS
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Clough-Brengle Co.

MICRO-MANIPULATORS
Hoffman Co., S. O.
Industrial Instruments
Mico Instrument Co.
Zeiss, Inc., Carl

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MICROMETERS, Calendar
Cook Mach. Tool Co.
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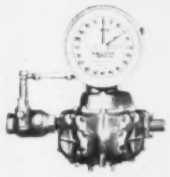
Oil and Gasoline Meters
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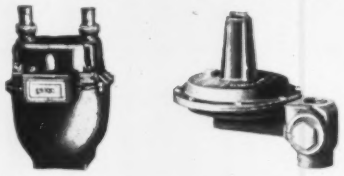
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Federal Prod. Corp.
Glogau & Co.
Haines Gauge Co.
Randall, Frank E.
Schertz Co., Inc.
Starrett Co.
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Millers Falls Co.
Reed Small Tool Works
Schertz Co., Inc.
Zeiss, Inc., Carl

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Gaertner Scientific Corp.
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Schertz Co., Inc.
Spencer Lens Co.
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Schertz Co., Inc.
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MICROSCOPES Biological, (See Microscopes, Binocular)

MICROSCOPES, Brinell
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Detroit Testing Mach.
Fisher Scientific Co.
Fuess, Inc.
Gaertner Scientific Corp.
Holz, Herman A.
Leitz, Inc.
Pittsburgh Inst. & Mach.
Riehle Division
Suter, Alfred

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Spencer Lens Co.

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Foerker, J. W.
Fuess, Inc.
Gaertner Scientific Corp.
Leitz, Inc.
Schertz Co., Inc.
Spencer Lens Co.
Zeiss, Inc., Carl

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MICROSCOPES, Measuring
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Foerker, J. W.

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Kern Co.
Leitz, Inc.
Mico Instrument Co.
Schertz Co., Inc.
Zeiss, Inc., Carl

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Clay Adams Co.
Fuess, Inc.
Leitz, Inc.
Mico Instrument Co.
Pfaltz & Bauer, Inc.
Schertz Co., Inc.
Zeiss, Inc., Carl

MICROSCOPES, Petrographical
Bausch & Lomb Optical
Fuess, Inc.
Leitz, Inc.
Spencer Lens Co.
Zeiss, Inc., Carl

MICROSCOPES, Thread Contour (See Microscopes, Finish Comparison)

MICROSCOPES Toolmaker's
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Fuess, Inc.
Gaertner Scientific Corp.
Goerz Amer. Optical
Leitz, Inc.
Mico Instrument Co.
Schertz Co., Inc.
Zeiss, Inc., Carl

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Bausch & Lomb Optical
Zeiss, Inc., Carl

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International Equip. Co.
Leitz, Inc.
Mico Instrument Co.
Pfaltz & Bauer, Inc.
Spencer Lens Co.
Thomas Co., Arthur H.

MICROVOLTMETERS (See Voltmeters, Micro)

MILEAGE METERS (See Meters, Mileage)

MILITARY INSTRUMENTS (See Ordnance Instruments)

MILK TESTERS (See Testers, Milk)

MILLIAMMETERS (See Ammeters, Milliammeters)

MILLIOHMMETERS (See Ohmmeters, Milliohmmeters)

MILLIVOLTMETERS (See Voltmeters, Millivoltmeters)

MINE GAS INDICATORS (See Detectors, Mine Gases)

MIRRORS, Angle
Kouffel & Esser Co.

MIRRORS, Astro
Foerker, J. W.

MIRRORS, Azimuth Circle
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Master Optical Co.
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MIRRORS, Galvanometer
Fish-Schurman Co.
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Perkin, Elmer & Moffitt
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Kouffel & Esser Co.
Kollmorgen Optical Co.
Perkin, Elmer & Moffitt

MIRRORS, Parabolic
Clark & Sons

MIRRORS, Plano
Fuess, Inc.
Kollmorgen Optical Co.
Master Optical Co.
Perkin, Elmer & Moffitt

MIRRORS, Sextant
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Fish-Schurman Co.
Kouffel & Esser Co.
Kollmorgen Optical Co.
Master Optical Co.
Perkin, Elmer & Moffitt
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MIRRORS, Spherical
Clark & Sons

MIRRORS, Spherical Stellite
Foerker, J. W.
Fuess, Inc.
Kollmorgen Optical Co.
Master Optical Co.
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MIRRORS, Stadimeter
Gurley, W. & L. E.
Kouffel & Esser Co.
Kollmorgen Optical Co.
Master Optical Co.
Perkin, Elmer & Moffitt

MODULATION METERS
Andrea, Victor J.
General Radio Co.
RCA Manufacturing Co.
Southern Electronics Labs.
Weston Elec. Inst. Corp.

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Fuess, Inc.
Industrial Inst. Inc.
Saxl Inst. Co.
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American Measuring Co.
Cambridge Inst. Co.
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Tagliabue Mfg. Co.
Toledo Scale Co.
Troemner, Henry
Williams Apparatus Co.

MOLECULAR STILLS
Distillation Prod., Inc.

MONOCHROMATIC LIGHT SOURCES (See Light Sources, Monochromatic)

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Baird Associates
Fuess, Inc.
Gaertner Scientific Corp.
Leitz, Inc.
Zeiss, Inc., Carl

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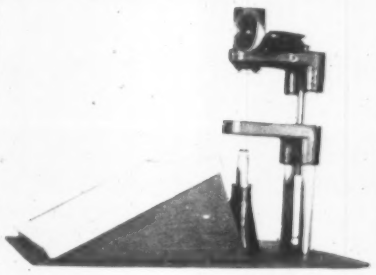

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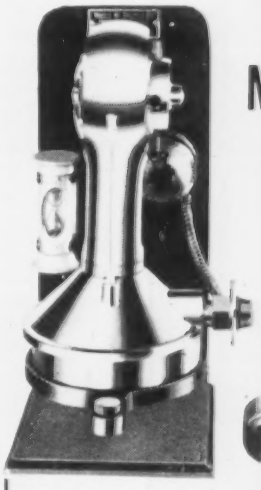

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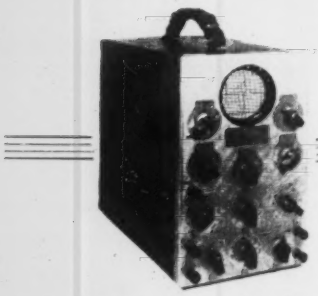

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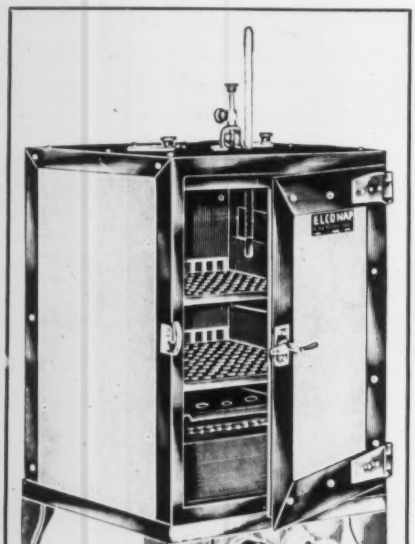

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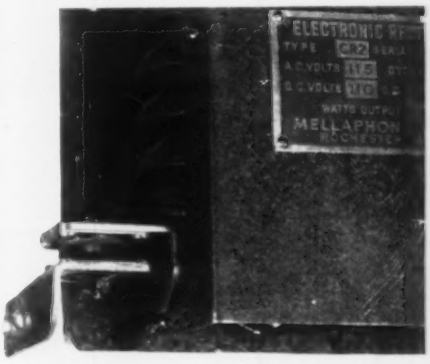

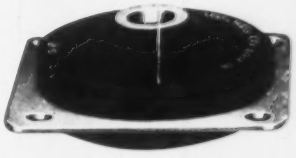

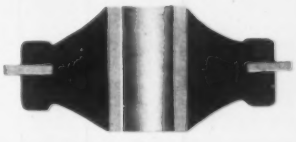

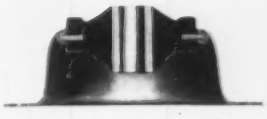

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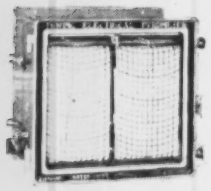


Fig. 1—Model 28 Recording Pyrometer, Multiple Recorder. Makes 2, 3, 4 or 6 records on continuous roll, twin charts. Dot and dash records, one color of ink. Metal case construction. Simplified and rugged. Automatic chart re-roll. Also furnished single record type.

Fig. 2—Model 19 MC Recording Pyrometer, single and multiple record types. Choice of spring drive or electric drive. Daily chart. Dot and dash records, metal case construction. Operates with minimum of attention.

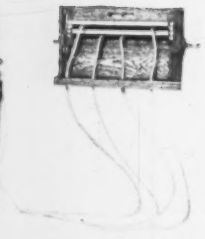


Fig. 3—Model 19 Recording Pyrometer. Single and multiple record recorders, daily chart, dot and dash recording, hardwood case, spring drive or electric drive. Can be used with switchboard and records obtained of desired maximum number of heat sources. Rugged, simple and foolproof.

Fig. 4—Model 30 Pyrometer with rotary selector switch mounted together in moisture, fume and dust proof case. Furnished with switch capacities 4, 6, 8, 12, 24 and 32 points and off position. Especially suitable for diesel engine service, ceramic plants, etc.

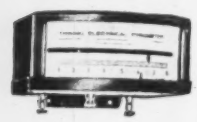


Fig. 5—Wall pattern, high resistance type, direct reading, furnished for any desired temperature range. Made in three sizes—with 3 inch, 6 inch or 9 inch long temperature scales.

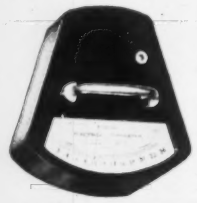


Fig. 6—Standard portable pattern. High resistance, single or double temperature ranges. Compact, strong, contained in enamelled aluminum case.

Fig. 7—Portable Laboratory Pattern, high resistance, single or double temperature ranges, 6 inch temperature scale, anti-parallax mirror. Contained in polished mahogany case.

Fig. 8—Type JR Multiple Point Pyrometer: Unit Construction, low resistance type, metal case construction. Switch furnished with 2, 4, 9 and 12 points and off position.

Fig. 9—Type JR Individual Pyrometer, low resistance type, furnished mounted on cast aluminum tripod bracket.

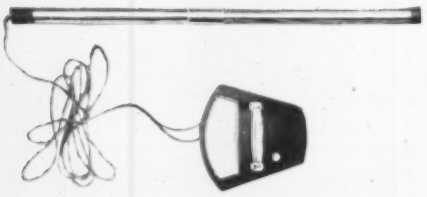


Fig. 10—Portable Radiation Pyrometer for indicating high temperatures to 5000 degrees Fahrenheit. Readings obtained by radiation receiving tube collecting heat radiations from hot object. Ideal for temperature readings of fire boxes, kilns of all kinds, etc.

Fig. 11—A5X Pyrometer, most practical and economical pyrometer for non-ferrous foundries. Thermocouple wire contained in magazine, is drawn out as needed. Junctions made by twisting wires together. Quick acting, temperature readings in eight seconds.

Fig. 12—Surface Temperature Pyrometer, for reading surface temperatures of revolving rolls, press platens, hot steel, etc. Contact thermocouple made in form suitable for individual application. Readings obtained in few seconds.

Fig. 13—Radiation Pyrometer receiving tube, ventilated type, for permanent installation, thermo-element enclosed.

Fig. 14—Radiation Pyrometer receiving tube, enclosed type, for permanent installation, thermo-element enclosed, his lens and mirrors to intensify and concentrate heat radiations. Also furnished with water jacket for installation in high ambient temperature.

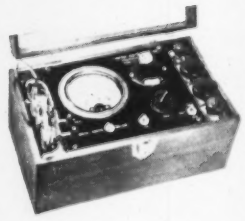


Fig. 15—Portable pH Meters, range 0 to 14 pH. Direct reading in pH units.

Model 1: Simple potentiometric circuit using quinhydrone or antimony electrodes.

Model 2: Vacuum tube potentiometric circuit using glass electrodes and/or quinhydrone and antimony electrodes.

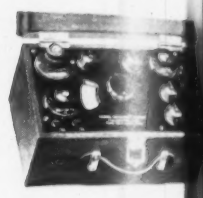


Fig. 16—Treasure Chest, accurate potentiometer, complete pyrometer and thermocouple testing [illegible] set combined in [illegible] able instrument. Supplied with Electrometer [illegible] unit.

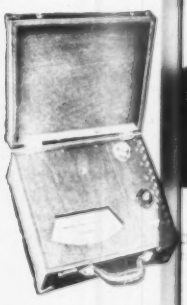


Fig. 17—Portable Indicating Electrical Resistance Thermometer, has rotary switch reading temperature readings of separate heat sources.

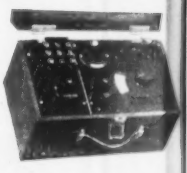


Fig. 18—Resistometer, resistance measuring instrument, wheatstone bridge type. Specially designed for checking and calibrating electrical resistance [illegible] resistance thermometers.

Fig. 19—Automatic Controller, very sensitive, accurately and automatically control temperature [illegible] applicable to fully automatically heated [illegible]

Thwing-Albert

Manufacturers of Scientific Instruments

3323 LANCASTER AVENUE

Commercial [illegible] Indicator

Laboratory Instruments

...9—Electrical Resistance ...meter, combined with ... push button switch as... mounted on bakelite ... entrined in metal case ... conditioning systems in ... etc.

Fig. 24—Research Tearing Tester, for research and exploratory work and for tear testing where sensitivity desired is finer than calibration of Standard Elmendorf Tester.

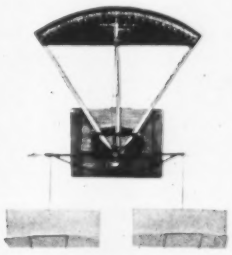


Fig. 27—Differential Scale, determines the weight of material used in coating or treating paper. Readings give weight per ream of material used in treating the paper.

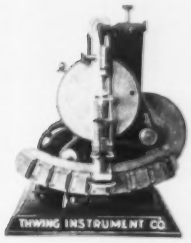


Fig. 31—Carlson Score Tester, tests fiber board at the scoring or crease by subjecting to combined tearing, bending and tensile test.

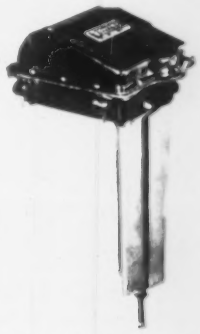


Fig. 33—White Water Sampler, takes samples of waste water automatically, by metered orifice, sample proportional to the flow. Operated electrically.

...3—Thermostat Box, heated ...by controlled automatic ... with the visible auto... ...of thermocouple ... error correction.

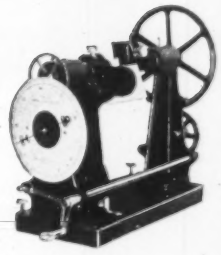


Fig. 25—Initial Tear Tester, measures the initial force required to start a tear. Direct reading; resistance to beginning of tear is indicated in force pounds. Especially suitable for testing box board, roofing felts, floor coverings, gasket papers, etc.

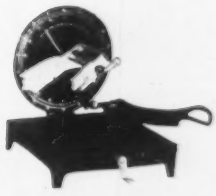


Fig. 32—Clark Paper Stiffness Tester, determines stiffness or softness of paper. Research Tester as shown has rollers to adjust length of sample.
Routine Tester has screw clamp for stiffness or softness tests on samples of specified length.

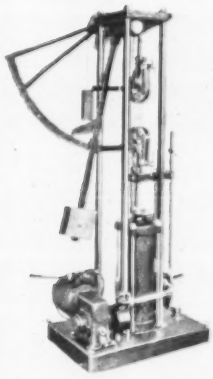
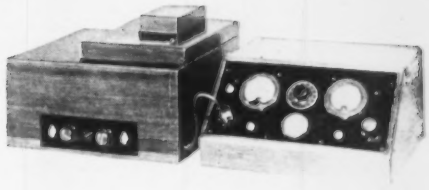
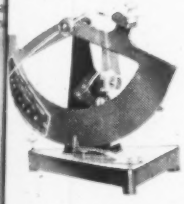


Fig. 28—Electro-Hydraulic Tensile Tester for Testing Paper, Textiles, Tape and Fine Wire. Tensile and elongation tests conform to the A.S.T.M. and T.A.P.P.I. official testing methods. Operated by electro-hydraulic power, self-contained. Can be furnished with graphic recording device.



...2—Enclosed Type Switch, ...ple rotary switch with ... and off position.



...3—Elmendorf Tearing ...determines tearing ... of paper and allied ... Works entirely by ... forces readings in force ... required to tear materials ... tearing tester of paper ...

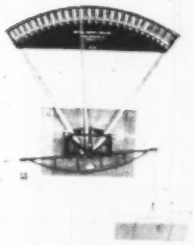


Fig. 26—Basis Weight Scale, reads directly from a single short number of pounds per ream of paper. Ranges furnished for a variety of weights. Suitable for moisture content determinations.

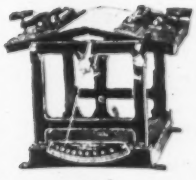


Fig. 29—McLaurin Gummed Tape Tester, determines critical strength of glue. Measures and indicates resistance while the glue just starts to setting.

Fig. 30—Penescope, for testing paper and other materials for permeability to solutions. Provides visual method for penetration testing.
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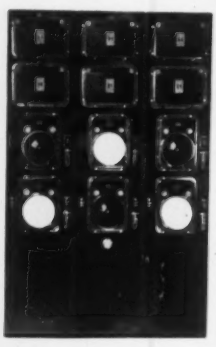

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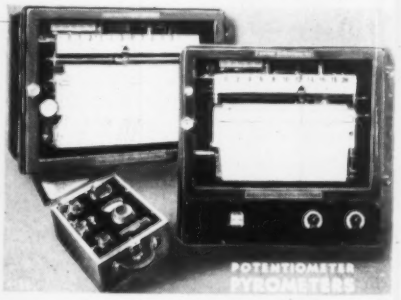

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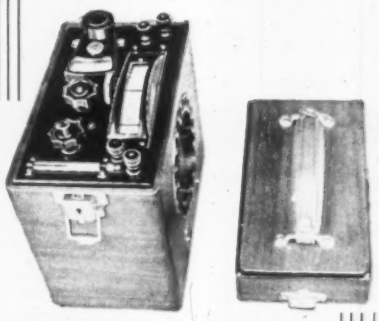

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Taylor Inst. Cos.

PRESSURE INDICATORS, Bourdon-tube
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Baldwin-Southwark Corp.
Bristol Co.
Brown Inst. Co.
Crosby Steam Gage Co.
Dickson Co.
Foxboro Co.
Halpern, Walter J.
Hoke, Inc.
Kenyon Instrument Co.
Kollsman Inst. Co.
Marsh Corp., Jas. P.
Mason-Neilan Regulator
Republic Flow Meters
Star Brass Mfg. Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.

PRESSURE INDICATORS, Capsular-spring
Tagliabue Mfg. Co.

PRESSURE INDICATORS, Diaphragm
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Bailey Meter Co.
Brown Inst. Co.
Dickson Co.
Foxboro Co.
Hagan Corp.
King Seeley Corp.
Kollsman Inst. Co.
Marsh Corp., Jas. P.
Mason-Neilan Regulator
Morey & Jones, Ltd.
Powers Regulator Co.
Rochester Mfg. Co.
Tagliabue Mfg. Co.

PRESSURE INDICATORS, Electrical-resistance
Baldwin Southwark Corp.
General Elec. Co.
Hagan Corp.
Kurman Electric Co.
Rubicon Co.

PRESSURE INDICATORS, Inverted-bell
Bacharach Indus. Inst.
Bailey Meter Co.
Bristol Co.
Brown Inst. Co.
Dickson Co.
Hagan Corp.
Mason-Neilan Regulator
Tagliabue Mfg. Co.
Taylor Inst. Cos.

PRESSURE INDICATORS, Membrane
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Dickson Co.
Mason-Neilan Regulator

PRESSURE INDICATORS, Piezoelectric
Batcher, Ralph R.
Brush Development Co.
Commercial Engg. Labs.
RCA Manufacturing Co.

PRESSURE INDICATORS, Piston, Weight-loaded
American Inst. Co.
Bailey Meter Co.
Hagan Corp.

PRESSURE INDICATORS, Single-tube, liquid column
Bacharach Indus. Inst.
Detroit Air Meter Co.
Dwyer Mfg. Co.
Gas App. Specialties
Morey & Jones, Ltd.
Precision Therm. & Inst.
Uehling Instrument Co.

PRESSURE INDICATORS, Spring-loaded piston
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Commercial Engg. Labs.
Hagan Corp.

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Bailey Meter Co.
Connelly Iron Sponge
Consol. Ashcroft Hancock
Detroit Air Meter Co.
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Friez & Sons
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Meram Co.
Moeller Instrument Co.
Morey & Jones, Ltd.
Precision Therm. & Inst.
Refinery Supply Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Uehling Instrument Co.

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Bristol Co.
Brown Inst. Co.
Consol. Ashcroft Hancock
Dickson Co.
Esterline-Angus Co.
Mason-Neilan Regulator
Morey & Jones, Ltd.
Republic Flow Meters
Tagliabue Mfg. Co.
Taylor Inst. Cos.

PRESSURE RECORDERS, Bourdon tube
Bailey Meter Co.
Baldwin-Southwark Corp.
Bristol Co.
Brown Inst. Co.
Consol. Ashcroft Hancock
Dickson Co.
Esterline-Angus Co.
Foxboro Co.
Improved Gauge Mfg. Co.
Kenyon Instrument Co.
Leeds & Northrup Co.
Marsh Corp., Jas. P.
Mason-Neilan Regulator
Morey & Jones, Ltd.
Republic Flow Meters
Star Brass Mfg. Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Thrush & Co., H. A.

PRESSURE RECORDERS, Capsular-spring
Tagliabue Mfg. Co.

PRESSURE RECORDERS, Diaphragm
Bailey Meter Co.
Brown Inst. Co.
Foxboro Co.
Dickson Co.
Marsh Corp., Jas. P.
Mason-Neilan Regulator
Morey & Jones, Ltd.
Tagliabue Mfg. Co.

PRESSURE RECORDERS, Electrical-resistance
Republic Flow Meters

PRESSURE RECORDERS, Inverted-bell
Bacharach Indus. Inst.
Bailey Meter Co.
Bristol Co.
Brown Inst. Co.
Dickson Co.
Leeds & Northrup Co.
Mason-Neilan Regulator
Taylor Inst. Cos.
Uehling Instrument Co.

PRESSURE RECORDERS, Membrane
Mason-Neilan Regulator

PRESSURE RECORDERS, Piezoelectric
Brush Development Co.
RCA Manufacturing Co.

PRESSURE RECORDERS, Piston, weight-loaded
Bailey Meter Co.

PRESSURE RECORDERS, Single-tube liquid column
Uehling Instrument Co.

PRESSURE RECORDERS, Spring-loaded piston
Bacharach Indus. Inst.
Baldwin-Southwark Corp.
Commercial Engg. Labs.
Esterline-Angus Co.

PRESSURE RECORDERS, U-tube
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Brown Inst. Co.
Mason-Neilan Regulator
Republic Flow Meters
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Uehling Instrument Co.

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Meriam Co.
Ray Pressure Snubber
Tagliabue Mfg. Co.

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Kruttl & Esser Co.
Kollmorgen Optical Co.
Machlett & Son
Master Optical Co.
Perkin, Elmer & Muller
Spencer Lens Co.
Valley Crystal

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PROGRAM CLOCKS (See Timers, Automatic Process)

PROTRACTORS, Bevel (See Drawing Instruments)

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Eastern Service Co.
Kenyon Instrument Co.
Kruttl & Esser Co.
Marine Compass Co.
Negus, T. S. & J. D.
Pioneer Instrument Co.
Warren Knight Co.

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PROTRACTORS, Transparent (See Drawing Instruments)

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Lambert Meter Co., Inc.
Pittsburgh Equit. Meter

PROVERS, Water Meter
Pittsburgh Equit. Meter

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Olsen Testing Machine
Pittsburgh Inst. & Mach.

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Electro-Medical Lab.
General Radio Co.
Phipps & Bird, Inc.

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Fuess, Inc.
G. M. Mfg. Co., Inc.
H-B Inst. Co., Inc.
Mason-Neilan Regulator
Moeller Instrument Co.
Palmer Co.

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Parks-Cramer Co.

PSYCHROMETERS, Electric
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Friez & Sons
Fuess, Inc.
G. M. Mfg. Co., Inc.
Leeds & Northrup Co.

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Dickson Co.
Foxboro Co.
Friez & Sons
Fuess, Inc.
Leeds & Northrup Co.
Mason-Neilan Regulator
Moeller Instrument Co.
Scientific Inst. Co.
Tagliabue Mfg. Co.

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Central Scientific Co.
Chicago Apparatus Co.
Foxboro Co.
Fred S. Lustig
Friez & Sons
Fuess, Inc.
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Green, Henry J.
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Cleveland Chicago Indianapolis

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Micromax is Industry's senior, modern, controlling or recording pyrometer. Dependable, sturdy, low in maintenance, fully automatic. Four models: Strip-Chart and Round-Chart Recording Controllers; Indicating and Non-Indicating Controllers. May use thermocouple, Rayotube (radiation detector) or Thermohm (resistance detector).

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(See Granular Materials)

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Machlett & Son
Refinery Supply Co.
Scientific Glass App.
Stirling Eng. Co.
Welch Mfg. Co.

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Fisher Scientific Co.
Rischer & Betzold
Specialty Glass Co.

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Cambridge Inst. Co.
Eppley Lab.
Leeds & Northrup Co.

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Brown Inst. Co.
Cambridge Inst. Co.
Foxboro Co.
Leeds & Northrup Co.
Lewis Engineering
Rubicon Co.
Tagliabue Mfg. Co.
Thwing-Albert Inst. Co.

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Cambridge Inst. Co.
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General Elec. Co.
Ill. Testing Labs.
Leeds & Northrup Co.
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Roller-Smith Co.
Rubicon Co.
Southw'n Electronics Labs.
Tagliabue Mfg. Co.
Thwing-Albert Inst. Co.
Wheelco Inst. Co.

PYROMETERS, Expansion
Defender Automatic Reg.
Fermet Co.
Partlow Corp.
Southw'n Electronics Labs.

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Bailey Meter Co.
Bristol Co.
Brown Inst. Co.
Burling Inst. Co.
Electronic Prod. Co.
Engelhard, Chas.
Foxboro Co.
Ill. Testing Labs.
Leeds & Northrup Co.
Lewis Engg. Co.
Partlow Corp.
Pyrometer Inst. Co.

PYROMETERS, Indicating Low
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Southw'n Electronics Labs.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Thwing-Albert Instrument
Wheelco Inst. Co.

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Cambridge Inst. Co.
Engelhard, Chas.
Foxboro Co.
Hoskins Mfg. Co.
Ill. Testing Labs.
Pyrometer Instrument Co.
Rubicon Co.
Southw'n Electronics Labs.
Taylor Inst. Cos.
Thwing-Albert Instrument
Wheelco Inst. Co.

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Brown Inst. Co.
Cambridge Inst. Co.
Fisher Scientific Co.
Leeds & Northrup Co.
Pyrometer Instrument Co.

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Bristol Co.
Cambridge Inst. Co.
Engelhard, Chas.
Foxboro Co.
Hoskins Mfg. Co.
Ill. Testing Labs.
Leeds & Northrup Co.
Lewis Engg. Co.
Pyrometer Instrument Co.
Rubicon Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Thwing-Albert Instrument
Wheelco Inst. Co.

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Bristol Co.
Brown Inst. Co.
Cambridge Inst. Co.
Dickson Co.
Foxboro Co.
Leeds & Northrup Co.
Lewis Engg. Co.
Rubicon Co.
Southw'n Electronics Labs.
Tagliabue Mfg. Co.
Thwing-Albert Instrument
Wheelco Inst. Co.

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Bailey Meter Co.
Brown Inst. Co.
Cambridge Inst. Co.
Engelhard, Chas.
Foxboro Co.
General Elec. Co.
Ill. Testing Labs.
Leeds & Northrup Co.
Thwing-Albert Instrument
Wheelco Inst. Co.

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Bacharach Industrial Inst.
Bristol Co.
Brown Inst. Co.
Cambridge Inst. Co.
General Elec. Co.
Leeds & Northrup Co.
Pyrometer Instrument Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Thwing-Albert Instrument
Wheelco Inst. Co.

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Bristol Co.
Brown Inst. Co.
Cambridge Inst. Co.
General Elec. Co.
Leeds & Northrup Co.
Pyrometer Instrument Co.
Tagliabue Mfg. Co.
Thwing-Albert Instrument

PYROMETERS, Thermoelectric, Immersion
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Bristol Co.
Brown Inst. Co.
Cambridge Inst. Co.
General Elec. Co.
Ill. Testing Labs.
Leeds & Northrup Co.
Lewis Engg. Co.
Partlow Corp.
Pyrometer Inst. Co.
Roller-Smith Co.

PYROMETERS, Thermoelectric, Immersion
Southw'n Electronics Labs.
Tagliabue Mfg. Co.
Thwing-Albert Instrument

PYROMETERS, Thermoelectric, Indicating
Am. Gas Furnace Co.
Bailey Meter Co.
Bristol Co.
Brown Inst. Co.
Cambridge Inst. Co.
Foxboro Co.
Hebler Co.
Hoskins Mfg. Co.
Ill. Testing Labs.
Leeds & Northrup Co.
Lewis Engg. Co.
Partlow Corp.
Pyrometer Instrument Co.
Roller-Smith Co.
Rubicon Co.
Scientific Inst. Co.
Southw'n Electronics Labs.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Thwing-Albert Instrument
Wheelco Inst. Co.

PYROMETERS, Thermoelectric, Recording & Controlling
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Bailey Meter Co.
Beck Co.
Bristol Co.
Brown Inst. Co.
Cambridge Inst. Co.
Engelhard, Chas.
Foxboro Co.
General Elec. Co.
Ill. Testing Labs.
Leeds & Northrup
Lewis Engg. Co.
Mason-Neilan Regulator
Partlow Corp.
Pyrometer Instrument Co.
Southw'n Electronics Labs.
Taylor Inst. Cos.
Thwing-Albert Instrument

PYROMETERS, Thermoelectric, S. face Contact
Bailey Meter Co.
Bristol Co.
Brown Inst. Co.
Cambridge Inst. Co.
Foxboro Co.
General Elec. Co.
Ill. Testing Labs.
Lewis Engg. Co.
Pyrometer Instrument Co.
Southw'n Electronics Labs.
Tagliabue Mfg. Co.
Thwing-Albert Instrument

PYROMETRIC CONES
(See Cones, Pyrometric)

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Hanovia Chem. & Mfg.
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RACKS, STEEL, For Capacitors, Resistors, Transformers, etc.
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Radio)
(See Micrometers, Radio)

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McFarlin Co.
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(See Micrometers, Radio)

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(See Analyzers, Radio Set)

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(See Panels, Radio Test)

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(See Checkers, Radio Tube)

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Leupold, Voigtel & Co.
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Taylor Inst. Cos.
Warren Knight Co.
White Co., Inc.
Esterline-Angus Co.
Friez & Sons
Fuess, Inc.
Green, Henry J.
Leupold, Voigtel & Co.
Southw'n Electronics Labs.
Taylor Inst. Cos.

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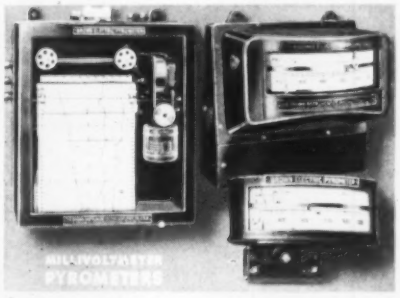
Kern Co.
Keuffel & Esser Co.
Kollmorgen Optical Co.
Leitz, Inc.
Precision Electr. & Inst.
White Co., Inc.



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AND
MINNEAPOLIS-HONEYWELL CONTROL SYSTEMS
To Measure and Control is to Economize

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Premier Crystal Labs.
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Bacharach Ind. Inst.
Commercial Eng. Labs.
Foxboro Co.
Friez & Sons
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Simplex Co.
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Dickson Co.
Foxboro Co.
Friez & Sons
International Filter
Mason-Neilan
Simplex Co.
Tagliabue Mfg. Co.
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Foxboro Co.
Friez & Sons
Tagliabue Mfg. Co.
Warren Telechron Co.

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Foxboro Co.
Friez & Sons
Gaertner Scientific
Simplex Co.

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Consol. Ashcroft
Dickson Co.
Leeds & Northrup Co.
Simplex Co.
Tagliabue Mfg. Co.

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Leeds & Northrup Co.
Mason-Neilan
Tagliabue Mfg. Co.

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General Elec. Co.
Raytheon Mfg. Co.
Standard Elec. Time
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Eclipse Aviation
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Raytheon Mfg. Co.
Southwestern Electronics Labs.
United Transformer Corp.

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Continental Elec. Co.
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Bausch & Lomb Optical
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Fish-Schurman Co.
Fuess, Inc.
Perkin, Elmer & Moffitt

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Black-Ray Lighting Co.

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Baird Associates
Bausch & Lomb Optical
Clark & Sons
Ecker, J. W.
Fish-Schurman Co.
Fuess, Inc.
Perkin, Elmer & Moffitt
Tinsley Labs.

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Baird Associates
Bausch & Lomb Optical
Clark & Sons
Ecker, J. W.
Fish-Schurman Co.
Fuess, Inc.
Master Optical Co.
Perkin, Elmer & Moffitt
Tinsley Labs.

REFLECTORS, Heat Resisting
Am. Telescope Labs.
Bausch & Lomb Optical
Fish-Schurman Co.
Fuess, Inc.
Perkin, Elmer & Moffitt

REFLECTORS, Parabolic
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Baird Associates
Bausch & Lomb Optical
Clark & Sons
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Fish-Schurman Co.
Fuess, Inc.
Perkin, Elmer & Moffitt
Tinsley Labs.
Weber Bros. Metal Works

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Bausch & Lomb Optical
Clark & Sons
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Fish-Schurman Co.
Fuess, Inc.
Perkin, Elmer & Moffitt
Tinsley Labs.

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Bausch & Lomb Optical
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Kollmorgen Optical Co.
Perkin, Elmer & Moffitt

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Fuess, Inc.
Industro Scientific Co.
Spencer Lens Co.
Zeiss, Inc., Carl

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Bryston Co.
Bristol Co.
Brooke Eng. Co.
Brown Inst. Co.
Cash Co.
Connelly Iron Sponge
Consol. Ashcroft Hancock
Cutler-Hammer, Inc.
Davis Reg. Co.
DeEste Co.
Detroit Lubricator

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Foster Engg. Co.
Foxboro Co.
Friez & Sons
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Hagan Corp.
Hanlon Waters, Inc.
Hoke, Inc.
Judson Governor Co.
Kreis & Mueller
Lammert & Mann Co.
Leslie Co.
Linde Air Products Co.
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McAlear Mfg. Co.
McCorkle Co.
Meroon Regulator Co.
National Airoil Burner
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Partlow Corp.
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Penn Electric Switch Co.
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Powers Regulator Co.
Preferred Utilities Mfg.
Republic Flow Meters
Reynolds Gas Regulator
Robertshaw Thermostat
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Ruggles-Klingemann
Schade Valve Mfg.
Sprague Meter Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Thrush & Co., H. A.
United Cinephone Corp.
Vaughn G. E. Witt Co.
Victor Equipment Co.
Watts Regulator Co.
White-Rodgers Electric
Wilgus Mfg. Co.

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Parks-Cramer Co.
Powers Regulator Co.
Robertshaw Thermostat

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Bailey Meter Co.
Brooke Eng. Co.
Brown Inst. Co.
Cash Co.
Connelly Iron Sponge
Eclipse Fuel Engg.
Fisher Governor Co.
Foster Engg. Co.
Foxboro Co.
General Regulator Corp.
Hagan Corp.
Hays Corp.
Hanlon Waters, Inc.
Mason-Neilan Regulator
McAlear Mfg. Co.
McDonnell & Miller
National Brass Co.
Natural Gas Equipment
Penn Electric Switch
Perfex Corp.
Republic Flow Meters
Robertshaw Thermostat
Ruggles Klingemann
Tagliabue Mfg. Co.
Thrush & Co., H. A.
Wilgus Mfg. Co.

REGULATORS, AUTOMATIC, Compressed Gas
American Meter Co.
Bailey Meter Co.
Brooke Eng. Co.
Brown Inst. Co.
Cash Co.
Dockson Co.
Electrimatic Corp.
Fisher Governor Co.
Frick Co.
Hanlon Waters, Inc.
Hoke, Inc.
Linde Air Products Co.
Mason-Neilan Regulator
Meroon Regulator Co.
Natural Gas Equipment
Pgh. Equitable Meter
Republic Flow Meters
Reynolds Gas Regulator
Robertshaw Thermostat
Tagliabue Mfg. Co.
Victor Equipment Co.

REGULATORS, AUTOMATIC, Condensation (See Controllers, Automatic, Condensation)

REGULATORS, AUTOMATIC, Consistency (Paper & Pulp) (See Controllers, Automatic, Consistency)

REGULATORS, AUTOMATIC, Current
Allis-Chalmers Mfg. Co.
Amperite Corp.
Burlington Inst. Corp.
Cutler-Hammer, Inc.

REGULATORS, AUTOMATIC, Current (Cont'd)
General Elec. Co.
Monitor Controller, Co.
Robertshaw Thermostat
Roller-Smith Co.
Southwestern Electronics Labs.

REGULATORS, AUTOMATIC, Damper (See Controllers, Automatic, Damper)

REGULATORS, AUTOMATIC, District (See Governors, District)

REGULATORS, AUTOMATIC, Draft (See Controllers, Automatic, Draft)

REGULATORS, AUTOMATIC, Drying Chamber
Powers Regulator Co.
United Cinephone Corp.
Askania Regulator Co.
Atlas Valve Co.
Bailey Meter Co.
Brown Inst. Co.
Cochrane Corp.
Hays Corp.
Leeds & Northrup Co.
Defender Automatic Reg.
Eclipse Fuel Engg. Co.
General Regulator Corp.

REGULATORS, AUTOMATIC, Feed Water
Hagan Corp.
Hanlon Waters, Inc.
Mason-Neilan Regulator
McAlear Mfg. Co.
McDonnell & Miller
Meroon Regulator Co.
Natural Gas Equipment
Northern Equip. Co.
Ruggles-Klingemann
Stein Co.
Tagliabue Mfg. Co.
Thrush & Co., H. A.
Vaughn G. E. Witt Co.
Watts Regulator Co.
Wilgus Mfg. Co.
Williams Gauge Co.

REGULATORS, AUTOMATIC, Flow (See Controllers, Automatic, Flow)

REGULATORS, AUTOMATIC, Flow Proportioning (See Controllers, Automatic, Flow Proportioning)

REGULATORS, AUTOMATIC, Fluid Proportioning (See Controllers, Automatic, Fluid Proportioning)

REGULATORS, AUTOMATIC, Frequency
Burlington Inst. Corp.
General Elec. Co.
Warren Telechron Co.
Wheelco Inst. Co.

REGULATORS, AUTOMATIC, Furnace (See Controllers, Automatic, Furnace)

REGULATORS, AUTOMATIC, Gas (See Regulators, Automatic, Air)

REGULATORS, AUTOMATIC, Humidity (See Controllers, Automatic, Humidity)

REGULATORS, AUTOMATIC, Liquid Level (See Controllers, Automatic, Liquid Level)

REGULATORS, AUTOMATIC, Load
Allis-Chalmers Mfg. Co.
Automatic Valve Controller
Hays Corp.
Leeds & Northrup Co.

REGULATORS, AUTOMATIC, Oil Feed
Askania Regulator Co.
Atlas Valve Co.
Brown Inst. Co.
Cash Co.
DeEste Co.
Foster Engg. Co.
General Regulator Corp.
Hagan Corp.
Lammert & Mann Co.
Mason-Neilan Regulator
McCorkle Co.
National Airoil Burner
Republic Flow Meters
Spence Engineering Co.
Taylor Inst. Cos.
United Cinephone Corp.
Vaughn G. E. Witt Co.
Wilgus Manufacturing

REGULATORS, AUTOMATIC, Power Factor
Allis-Chalmers Mfg. Co.
Leeds & Northrup Co.
United Cinephone Corp.

REGULATORS, AUTOMATIC, Pressure (See Controllers, Automatic, Pressure)

REGULATORS, AUTOMATIC, Pump
Allen-Bradley Co.
Arca Regulators, Inc.
Askania Regulator Co.
Atlas Valve Co.
Bailey Meter Co.
Bellfield Co.
Bryston Co.
Brown Inst. Co.
Builders Iron Foundry
Cash Co.
Davis Reg. Co.
DeEste Co.
Fisher Governor Co.
Ford Reg. Valve Co.
Foster Engg. Co.
Furnas Electric Co.
General Regulator Corp.
Hagan Corp.
Hanlon Waters, Inc.
Hydraulic Press Co.
Klipfel Mfg. Co.
Leslie Co.
Mason-Neilan Regulator
McAlear Mfg. Co.
Meroon Regulator Co.
Northern Equip. Co.
Penn Electric Switch
Republic Flow Meters
Water Level Controls Co.
Schade Valve Mfg. Co.
Signier Engineering Co.
Tagliabue Mfg. Co.
Vaughn G. E. Witt Co.
Watts Regulator Co.
Wilgus Mfg. Co.

REGULATORS, AUTOMATIC, Refrigeration (See Controllers, Automatic, Refrigeration)

REGULATORS, AUTOMATIC, RKVA
Allis-Chalmers Mfg. Co.

REGULATORS, AUTOMATIC, Safety Fuel Shut-Off (See Valves, Automatic, Safety Fuel Shut-Off)

STABILIZED VOLTAGE
RAYTHEON VOLTAGE REGULATORS
are magnetic devices without moving parts or adjustments which automatically stabilize AC voltages to plus or minus 1%
SOME BENEFITS OF STABILIZED VOLTAGE
Factory Test Equipment—eliminates manual voltage adjustments
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Photo-cell Light sources—stabilizes illumination
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Pirani Gauges—permits AC operation
WRITE FOR NEW
Bulletin DL 48-71G19
RAYTHEON MFG. CO.
WALTHAM, MASS.

For addresses, see pages 54-58

REGULATORS, AUTOMATIC, Speed (See Controllers, Automatic, Speed)

REGULATORS, AUTOMATIC, Steam (See Regulators, Automatic, Pressure)

REGULATORS, AUTOMATIC, Steam Pressure (See Regulators, Automatic, Pressure)

REGULATORS, AUTOMATIC, Synchronizing
Allis-Chalmers Mfg. Co.
Industrial Engr. Corp.
Magnetic Gauge Co.

REGULATORS, AUTOMATIC, Temperature (See Controllers, Automatic, Temperature)

REGULATORS, AUTOMATIC, Time (See Controllers, Automatic, Time)

REGULATORS, AUTOMATIC, Vacuum (See Controllers, Automatic, Vacuum)

REGULATORS, AUTOMATIC, Viscosity (See Controllers, Automatic, Viscosity)

REGULATORS, AUTOMATIC, Voltage
Allis-Chalmers Mfg. Co.
American Transformer
Amperite Corp.
Burlington Inst. Corp.
Clarostat Mfg. Co.
Eclipse Aviation
Electronic Prod. Co.
General Elec. Co.
Ideal Commutator Dresser
International Resistance
Luxtrol Co., Inc.
Miller Co., Bertrand F.
Raytheon Mfg. Co.
Roller-Smith Co.
Sorensen Electronics Labs.
Tagliabue Mfg. Co.
United Cinephone Corp.
United-Transformer Corp.
Ward Leonard Elec. Co.

REGULATORS, AUTOMATIC, Water Pressure (See Regulators, Automatic, Pressure)

REGULATORS, AUTOMATIC, Welding, Gas
Bastian-Blessing Co.
Dockson Co.
Victor Equipment Co.

REGULATORS, MANUAL (Non-Automatic)
Allen-Bradley Co.
Bailey Meter Co.
Bellfield Co.
Brown Inst. Co.
Cutler-Hammer, Inc.
Hanson-Waters, Inc.
National Aircraft Parts
National Elec. Controller
Standard Elec. Prods.
Tagliabue Mfg. Co.
United-Transformer Corp.
Ward Leonard Elec. Co.

RELAYS, Automatic
Allen-Bradley Co.
American Inst. Co.
American Automatic Elec.
Automatic Co.
Clare & Co.
Cutler-Hammer, Inc.
Eclipse Aviation
General Controls Co.
General Elec. Co.
Guardian Elec. Mfg. Co.
Hazan Corp.
Industrial Engr. Corp.
Kellogg Switchboard
Mercoid Corp.
Monitor Controller Co.
Paragon Electric Co.
Penn Electric Switch
Perley Corp.
Sorensen Electronics Labs.
Struthers-Dunn
Thrush & Co., H. A.
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

RELAYS, Capacity-Operated
Electronic Labs.
Luxtrol Co., Inc.
Sorensen Electronics Labs.

RELAYS, Circuit Control
Advance Electric Co.
Allen-Bradley Co.
American Automatic Elec.
(Continued on next page)

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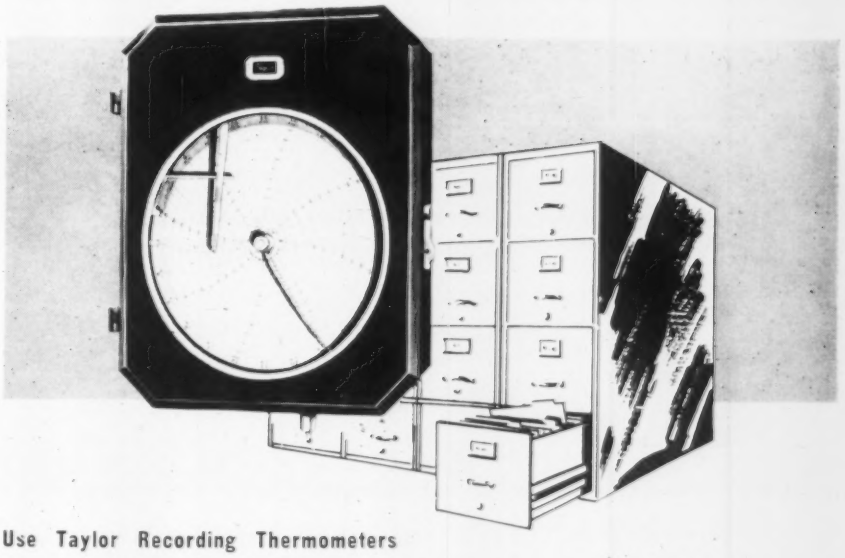

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The Type "TH" Transtat is the new continuously variable auto-transformer regulator . . . the ideal voltage control for a.c. circuits. It offers high efficiency, good regulation, great flexibility and dependable construction at moderate cost. Standard types are available for controlling voltage to single-phase and polyphase loads rated 10 Kva. and smaller, 50 or 60 cycles, 115, 230 or 460 volts. May we send you bulletin 51-1 which contains complete data?

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VOLTAGE REGULATORS

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Are used by the Civil Aeronautics Authority on its full Automatic Emergency Power Plants for Airway Radio Stations.

Are used on power plants of scientific expeditions.

Are used by Engine and Generator Manufacturers, Isolated Power Plants and Industrial Plants throughout the United States, in Canada, and in Mexico.

BURLINGTON INSTRUMENT CORPORATION
BURLINGTON, IOWA

For addresses, see pages 54-58

BULLETIN 81 Intermediate duty
BULLETIN 106 Light duty
BULLETIN 131 Heavy duty
BULLETIN 251 Sensitive type
BULLETIN 351 Thermal time-delay
BULLETIN 362 Motor driven time-delay

must be DEPENDABLE

Every user of a relay points to his application as the one place where dependability is paramount. The fact is, a relay is a control device and therefore the functioning of the entire equipment with which it is used, depends upon the relay. Ward Leonard recognizes the responsibility placed upon relays today and produces both relays and relay control assemblies that are the utmost in dependability, positive function and long life. Send for bulletins of interest.

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ELECTRIC COMPANY

38 South Street, Mount Vernon, N. Y.

ELECTRIC CONTROL DEVICES SINCE 1892

RELAYS, Circuit Control
(Cont'd)
American Inst. Co.
Autocall Co.
Automatic Switch Co.
Brown Inst. Co.
Clare & Co.
Electric Controller
Friez & Sons
General Elec. Co.
Guardian Elec. Mfg. Co.
H-B Inst. Co., Inc.
Kellogg Switchboard
Leach Relay Co.
Lumenite Elec. Co.
Miller Co., Bertrand F.
Monitor Controller Co.
Paragon Electric Co.
Sigma Instruments, Inc.
Standard Elec. Prods.
Struthers-Dunn
Thrush & Co., H. A.
United Cinephone Corp.
Ward Leonard Elec. Co.
Western Electro-Mech.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

RELAYS, Continuous Current
Allen-Bradley Co.
American Automatic Elec.
American Inst. Co.
Autocall Co.
Clare & Co.
General Elec. Co.
Guardian Elec. Mfg. Co.
H-B Inst. Co., Inc.
Kellogg Switchboard
Paragon Electric Co.
Struthers-Dunn
Thrush & Co., H. A.
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

RELAYS, Control
Allen-Bradley Co.
Advance Electric Co.
American Automatic Elec.
American Inst. Co.
Autocall Co.
Automatic Switch Co.
Brown Inst. Co.
Clare & Co.
Cutler-Hammer, Inc.
Electric Controller
Friez & Sons
General Controls Co.
General Elec. Co.
Guardian Elec. Mfg. Co.
Hagan Corp.
H-B Inst. Co., Inc.
Industrial Eng. Corp.
Kellogg Switchboard
Miller Co., Bertrand F.
Monitor Controller Co.
Perfex Corp.
Precision Therm. & Inst.
Roller-Smith Co.
Standard Elect. Prods.
Struthers-Dunn
United Cinephone Corp.
Ward Leonard Elec. Co.
Western Electro-Mech.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

RELAYS, Demand Totalizing
Autocall Co.
General Elec. Co.
Hagan Corp.
United Cinephone Corp.
Westinghouse Elec. & Mfg.

RELAYS, Electro-Magnet
Advance Electric Co.
Allen-Bradley Co.
American Automatic Elec.
American Inst. Co.
Autocall Co.
Automatic Switch Co.
Clare & Co.
Cutler-Hammer, Inc.
Friez & Sons
General Elec. Co.
G-M Labs.
Guardian Elec. Mfg. Co.
H-B Inst. Co.
Industrial Eng. Corp.
Kellogg Switchboard
Kurman Electric Co.
Leach Relay Co.
Miller Co., Bertrand F.
Monitor Controller Co.
Penn Electric Switch Co.
Perfex Corp.
Phila. Thermometer Co.
Precision Therm. & Inst.
Sigma Instruments, Inc.
Standard Elect. Prods.
Struthers-Dunn
United Cinephone Corp.
Ward Leonard Elec. Co.
Western Electro-Mech.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.
White Rodgers Electric
Zenith Electric Co.

RELAYS, Heavy Duty
(Cont'd)
Allen-Bradley Co.
American Automatic Elec.
American Inst. Co.
Autocall Co.
Automatic Switch Co.
Cutler-Hammer, Inc.
General Elec. Co.
H-B Inst. Co., Inc.
Miller Co., Bertrand F.
Monitor Controller Co.
Penn Electric Switch Co.
Philadelphia Thermometer
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg.
Zenith Electric Co.

RELAYS, Instrument Controlled
American Automatic Elec.
American Inst. Co.
Autocall Co.
Brown Inst. Co.
Clare & Co.
Cramer & Co., Inc.
Friez & Sons
General Elec. Co.
Guardian Elec. Mfg. Co.
H-B Inst. Co., Inc.
Kurman Electric Co.
Perfex Corp.
Phila. Thermometer Co.
Precision Therm. & Inst.
Roller-Smith Co.
Southw'n Electronics Labs
Struthers-Dunn
Triplett Electrical Inst.
United Cinephone Corp.
Ward Leonard Elec. Co.
Weston Elec. Inst. Corp.

RELAYS, Light Sensitive (See Photoelectric below)

RELAYS, Magnetic (See Relays, Electro-Magnet)

RELAYS, Mercury
American Automatic Elec.
American Inst. Co.
Autocall Co.
Continental Elec. Co.
H-B Elec. Co., Inc.
H-B Inst. Co., Inc.
Loewenberg, F.
Precision Therm. & Inst.
Weston Elec. Inst. Corp.

RELAYS, Mercury Tube
American Inst. Co.
Autocall Co.
Brown Inst. Co.
Clare & Co.
General Control Co.
G-M Labs.
Guardian Elec. Mfg. Co.
H-B Elec. Co., Inc.
H-B Inst. Co., Inc.
Loewenberg, F.
Phila. Thermometer Co.
Precision Therm. & Inst.

RELAYS, Mercury Tube
(Cont'd)
Steele, Erick F.
Struthers-Dunn
Ward Leonard Elec. Co.
Weston Elec. Inst. Corp.

RELAYS, Motor Driven Time Delay
Advance Electric Co.
American Inst. Co.
Cramer & Co., Inc.
Southw'n Electronics Labs
Struthers-Dunn
Friez & Sons
General Elec. Co.
Industrial Eng. Corp.
Monitor Controller Co.
Paragon Electric Co.
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.
Zenith Electric Co.

RELAYS, Movable Coil A.C.
Esterline-Angus Co.
Etna Elec. Works
General Elec. Co.
Weston Elec. Inst. Corp.

RELAYS, Overload
Allen-Bradley Co.
Autocall Co.
Cutler-Hammer, Inc.
Electric Controller
General Elec. Co.
Guardian Elec. Mfg. Co.
Leach Relay Co.
Penn Electric Switch
Roller-Smith Co.
Standard Elect. Prods.
Struthers-Dunn
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg.

RELAYS, Permanent Magnet Movable Coil
Esterline-Angus Co.
Etna Elec. Works
General Elec. Co.
Triplett Electrical Inst.
Weston Elec. Inst. Corp.

RELAYS, Photoelectric
Advance Electric Co.
American Inst. Co.
Clare & Co.
Continental Elec. Co.
Cutler-Hammer, Inc.
Dickson Co.
Electronic Lab.
Electronic Prod. Co.
Ess Instrument Co.

★NOW—Ohmite provides perfect protection against humidity, salt air and other severe atmospheric conditions—insures sustained accuracy and trouble-free life. These new precision units are pie-wound and enclosed in strong glass tubes with the terminals emerging through vacuum-tight glass seals. Ideal for laboratory and test equipment as well as all other applications, particularly in industrial, coastal, marine and tropical locations. Non-inductive winding. Resistance 0.1 ohm to 2 megohms. 1 watt rating—1% accurate (or closer tolerances when required). Provided with soldering lugs and wire terminals or with tube base. Write today for complete information.

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In addition to the pneumatic, Foxboro offers electric distance transmission. For information on both systems write for DMF 714 and DMF 727. The Foxboro Company, 46 Neponset Avenue, Foxboro, Mass., U. S. A. Branch offices in 25 Principal Cities.

For addresses, see pages 54-58

RELAYS, Photoelectric (Cont'd)
Etna Elec. Works
General Controls Co.
General Elec. Co.
G-M Labs.
Leach Relay Co.
Lipman Engg. Co.
Lumenite Elec. Co.
Luxtrol Co., Inc.
Photobell Corp.
Photoswitch, Inc.
Precision Therm. & Inst.
Sigma Instruments, Inc.
Southw'n Electronics Labs.
United Cinephone Corp.
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

RELAYS, Polarized
American Automatic Elec.
Autocall Co.
Edison Electrical Controls
L. A. B. Corp.
Miller Co., Bertrand F.
Precision Therm. & Inst.
Struthers Dunn
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

RELAYS, Power
American Automatic Elec.
American Inst. Co.
Automatic Switch Co.
Esterline-Angus Co.
General Controls Co.
General Elec. Co.
Hagan Corp.
Struthers Dunn
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

RELAYS, Power Factor
Esterline-Angus Co.
L. A. B. Corp.
Westinghouse Elec. & Mfg.

RELAYS, Telephone Auxiliary Ringing
Advance Electric Co.
American Automatic Elec.
Autocall Co.
Clare & Co.
Kellogg Switchboard
Kurman Electric Co.
Leach Relay Co.
Standard Elect. Prods.
Struthers Dunn
Western Electro-Mech.

RELAYS, Thermal Time Delay
Advance Electric Co.
Allen-Bradley Co.
American Automatic Elec.
Am. Gas Accumulator
American Inst. Co.
Autocall Co.
Automatic Temp. Control
Cramer & Co., Inc.
Cutler-Hammer, Inc.
Eagle Signal Corp.
Edison Electrical Controls
Electric Controller
Electronic Prod. Co.
General Elec. Co.
Guardian Elec. Mfg. Co.
Industrial Eng. Corp.
Loewenberg, F.
Luxtrol Co., Inc.
Magnetic Gauge Co.
Paragon Electric Co.
Perfex Corp.
Photobell Corp.
Precision Therm. & Inst.
Preferred Utilities Mfg.
Spencer Thermostat Co.
Standard Elect. Prods.
Struthers Dunn
Ward Leonard Elec. Co.
Thrush & Co., H. A.
Ward Leonard Elec. Co.
Weston Elec. Inst. Corp.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.
White-Rodgers Electric
Zenith Electric Co.

RELAYS, Time Delay (See Relays, Thermal Time Delay)

RELAYS, Transformer (Low Voltage)
Allen-Bradley Co.
Eclipse Aviation
Friez & Sons
General Controls Co.
Gleason-Avery, Inc.
Guardian Elec. Mfg. Co.
H-B Inst. Co., Inc.
Industrial Eng. Corp.
Miller Co., Bertrand F.
Paragon Electric Co.
Penn Electric Switch
Perfex Corp.
Sigma Instruments, Inc.
Struthers Dunn
Westinghouse Elec. & Mfg.
White-Rodgers Electric

RELAYS, Vacuum Contact
American Automatic Elec.
American Inst. Co.

RELAYS, Vacuum Tube
American Inst. Co.
Continental Elec. Co.
Electro-Medical Lab.
Electronic Prod. Co.
General Controls Co.
General Elec. Co.
G-M Labs.
L. A. B. Corp.
Lumenite Elec. Co.
Luxtrol Co., Inc.
Photobell Corp.
Precision Therm. & Inst.
RCA Manufacturing Co.
Sargent & Co.
Sigma Instruments
Southw'n Electronics Labs.
Standard Elect. Prods.
Struthers-Dunn
United Cinephone Corp.

REMOTE-CONTROL EQUIPMENT
Allen-Bradley Co.
American Automatic Elec.
Area Regulators, Inc.
Akania Regulator Co.
Atlas Valve Co.
Autocall Co.
Bailey Meter Co.
Bistol Co.
Brooke Eng. Co.
Brown Inst. Co.
Clare & Co.
Cutler-Hammer, Inc.
Davis Reg. Co.
Elec. Indicator Corp.
Electrimatic Co.
Electronic Lab.
Elsbett Mfg. Co.
Foxboro Co.
General Elec. Co.
Hanlon-Waters, Inc.
Hatt Mfg. Co.
Hays Corp.
H-B Inst. Co., Inc.
Illinois Eng. Co.
International Filter Co.
Kol'sman Inst. Co.
Kurman Electric Co.
Luxtrol Co., Inc.
Mason-Neilan Regulator
Perfex Corp.
Photobell Corp.
Powers Regulator Co.
RCA Manufacturing Co.
Republic Flow Meters
Scientific Inst. Co.
Southw'n Electronics Labs.
United Cinephone Corp.
Zenith Electric Co.

REMOTE-METERING EQUIPMENT, ELECTRICAL
Andrew, Victor J.
Bristol Co.
Brown Inst. Co.
Builders Iron Foundry
Elec. Indicator Corp.
Elec. Tachometer Corp.
Esterline-Angus Co.
Foxboro Co.
General Elec. Co.
W. & L. E. Gurley
Kellogg Switchboard
Kurman Electric Co.
L. A. B. Corp.
Leeds & Northrup Co.
Mason-Neilan Regulator
Morey & Jones, Ltd.
Republic Flow Meters
Tagliabue Mfg. Co.
Westinghouse Elec. & Mfg.

REMOTE-METERING EQUIPMENT, HYDRAULIC
Brown Inst. Co.
Builders Iron Foundry
International Filter Co.
Leupold, Voigtel & Co.
Westinghouse Elec. & Mfg.

REMOTE-METERING EQUIPMENT, PNEUMATIC
American Meter Co.
Bristol Co.
Brown Inst. Co.
Foxboro Co.
Mason-Neilan Regulator

RESISTANCE LOADING EQUIPMENT
Eastern Specialty Co.
Hardwick, Hindle, Inc.
International Resistance
Precision Resistor Co.

RESISTANCES
Allen-Bradley Co.
Central Scientific Co.
Clarostat Mfg. Co.
Cutler-Hammer, Inc.
Daven Co.
General Radio Co.
International Resistance
Ohmite Mfg. Co.
Precision Resistor Co.
Sensitive Research Inst.
Shallcross Mfg. Co.

RESISTORS, CARBON COMPRESSION
Allen-Bradley Co.
International Resistance
Le Carbone Co., Inc.
Nat'l Carbon Co., Inc.
Ohio Carbon Co.
Continued on next page

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PRECISION
Wire Wound Resistors

● THE STANDARD FOR THE PAST TEN YEARS

A complete line, for all requirements. Designed to save production costs.

New conditions call for new types of resistors. We are ready with many new types of resistors to meet your requirements. Send for details.

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PRECISION RESISTOR COMPANY
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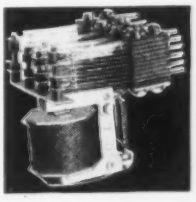
RELAYS *by Guardian*
For AC or DC Operation

Relays, Solenoids and Stepping Switches illustrated below show just a few of numerous types of electrical control units engineered and manufactured by Guardian Electric. Built by *specialists* in COMPACT and highly sensitive electrical controls, Guardian units possess unusual responsiveness and precision of action. The entire line has been designed and developed for maximum control in minimum space. Guardian Electric controls can be obtained for operation on any specified voltage to 220 DC, 110 AC on any current from .5 milliampere to 20 amperes; contact capacities to 1600 watts.

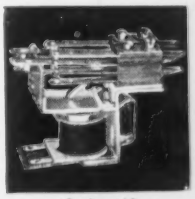


Series 30

ALTERNATING CURRENT RELAYS

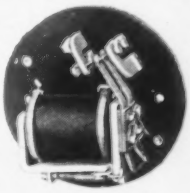
Series 30 (left). Supplied in three types of mounting, voltage range .1 to 110 volts, contact capacity 12 amperes. Size 2⅝x1⅛x2⅝".

Series 110 (right). Compact, economical, widely used unit. Four pole, double throw contacts, 5 amperes, 220 volt limit. Size 2⅝"x⅝"x1 15/16".



Series 110

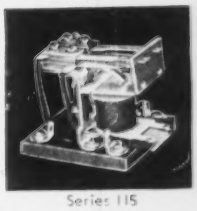
DIRECT CURRENT RELAYS



Series 5

Series 5 (left). Current drawn as low as one watt. Furnished completely enclosed—contact limit, double pole, double throw. Size 3"x3"x2".

Series 115 (right). Four pole, double throw contact capacity, rapid change over of contacts, full floating permanent magnet locked armature, special of space and cost.



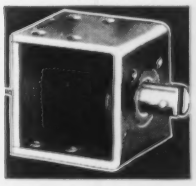
Series 115

S-T-E-P-P-I-N-G RELAYS

Versatile, advanced design, simple in principle. Many applications for these units are open for consideration giving circuit control hitherto deemed impossible. Rigidity of construction guaranteed. Over 100 interchangeable variations available.

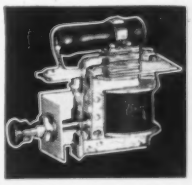
Type-R Stepping Relay

Type No. 2



SOLENOIDS— AC; DC

Type No. 2. Efficient, powerful—compact. For electro-mechanical operations involving remote control of mechanical motions such as electric counting, valve control and operation, faulty material ejector, automatic brake, electric indexing, etc. 2¼x1¾x1¾".

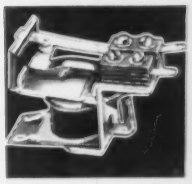


Overload Relays

Positive, precise protection against current surges, continuous overload. Manual reset. Size 4x2⅝x3⅛".

RF Relays Type R-100

Single or double pole, single or double throw relay with coil wound for 110 volt or 6 volt 60 cycle AC. For high frequency applications.



WRITE TO GUARDIAN for free engineering assistance on any control problem. No obligation. Ask for Big 100 Catalog L with full details and specifications on our complete line.

GUARDIAN ELECTRIC
1621 W. Walnut St. Chicago • Illinois

For addresses, see pages 54-58

RESISTORS, CARBON COMPRESSION
Allen Bradley Co.
G. S. Electric
Speer Carbon Co.
Welwyn Specialties Co.

RHEOSTATS, Battery Charging
Allen Bradley Co.
Allen Elec. & Equip. Co.
Cutler Hammer, Inc.
Hardwick, Hindle, Inc.
International Resistance
National Elec. Controller
Ohmite Mfg. Co.
Schaefer Bros. Co.
Ward Leonard Elec. Co.

RHEOSTATS, Field
Allen Bradley Co.
Cutler Hammer, Inc.
Electric Specialty Co.
Elec. Controller & Mfg.
International Resistance
Hardwick, Hindle, Inc.
Master Controller Co.
National Elec. Controller
Ohmite Mfg. Co.
Schaefer Bros. Co.
Ward Leonard Elec. Co.

RHEOSTATS, Laboratory
Allen Bradley Co.
American Inst. Co.
Biddle Co., Jas. G.
Central Scientific Co.
Chicago Apparatus Co.
Electric Specialty Co.
General Radio Co.
G-M Labs.
Hardwick, Hindle, Inc.
National Elec. Controller
Ohmite Mfg. Co.
Rubicon Co.
Schaefer Bros. Co.
Southern Electronics Labs.
Ward Leonard Elec. Co.

RHEOSTATS, Meter Testing
Allen Bradley Co.
Biddle Co., Jas. G. Nl
Electric Specialty Co.
Hardwick, Hindle, Inc.
International Resistance
Leeds & Northrup
National Elec. Controller
Ward Leonard Elec. Co.

RHEOSTATS, Slide Wire
Biddle Co., Jas. G.
Central Scientific Co.
Chicago Apparatus Co.
General Radio Co.
Hardwick, Hindle, Inc.
G-M Labs.
Leeds & Northrup
National Elec. Controller
Rubicon Co.
Shallcross Mfg. Co.
Southern Electronics Labs.
Ward Leonard Elec. Co.

RIDEOMETERS, RIDE COMFORT RECORDERS & RIDING-QUALITY INSTRUMENTS
Commercial Engg. Labs.
Impact Register Co.
Gurley Watch Co.
Sperry Products, Inc.

RULES, Adjustable Curve (See Drawing Instruments)

RULES, Aluminum
Keuffel & Esser Co.
Warren Knight Co.

RULES, Brass
Bliss & Co.
Micro Instrument Co.
Starrett Co.
Warren Knight Co.

RULES, Caliper
Gilman & Co.
Millers Falls Co.
Starrett Co.
Union Tool Co.
Warren Knight Co.

RULES, Drafting Room (See Drawing Instruments)

RULES, Folding
Bliss & Co.
Dietzen Co.
Keuffel & Esser Co.
Post Co., Frederick
Spindel & Co.
Starrett Co.
Warren Knight Co.

RULES, Glass
Fish-Schuman Co.
Glass Engraving Co.
Micro Instrument Co.

RULES, Parallel
Bliss & Co.
Dietzen Co.
Hamilton Mfg. Co.
Keuffel & Esser Co.
Negus, T. S. & J. D.
Spindel & Co.
Warren Knight Co.
White Co., Inc.
Post Co., Frederick

RULES, Precision Standard
Gaertner Scientific Corp.

RULES, Shrinkage
Keuffel & Esser Co.
Spindel & Co.
Starrett Co.
Warren Knight Co.

RULES, Slide (See Drawing Instruments)

RULES, Slide, Psychrometric
Friez & Sons

RULES, Steel
Kern Co.
Keuffel & Esser Co.
Micro Instrument Co.
Millers Falls Co.
Schott Co., Inc.
Spindel & Co.
Starrett Co.
Union Tool Co.
Warren Knight Co.

RULES, Wood
Herschel & Co.
Keuffel & Esser Co.
Post Co., Frederick
Spindel & Co.
Warren Knight Co.

RUNNING TIME TOTALIZERS
Cramer & Co., Inc.
Elec. Tachometer Corp.
Jaeger Watch Co.
Production Instrument
Southern Electronics Labs.

SACCHARIMETERS
Akatos, Inc.
General Scientific Co.
Eimer & Amend
Moeller Instrument Co.
Sargent & Co.

SACCHAROMETERS
Central Scientific Co.
Eimer & Amend
Fleischhauer & Son
G. M. Mfg. Co., Inc.
H-B Inst. Co.
Kimble Glass Co.
Moeller Instrument Co.
Precision Therm. & Inst.
Rascher & Betzold
Richfel Co.
Schultheis Corp.
E. W. Scientific Inst. Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Wagner & Son

SALINITY INDICATORS
Bendix Marine Products
Central Scientific Co.
Eimer & Amend
Engineering Labs., Inc.
Fleischhauer & Son
G. M. Mfg. Co., Inc.
H-B Inst. Co.
Leeds & Northrup Co.
Precision Therm. & Inst.
Rascher & Betzold
Richfel Co.
Schultheis Corp.
Scientific Inst. Co.
Southern Electronics Labs.
Tagliabue Mfg. Co.
Taylor Inst. Cos.

SALINOMETERS (See Salinity Indicators).

SAMPLER, Boiler Water
Natl. Aluminate Corp.

SAMPLERS, Oil
Braun Corp.
Central Scientific Co.
Pgh. Equitable Meter
Refinery Supply Co.
Scientific Glass Apparatus
Tagliabue Mfg. Co.

SAMPLERS, Oil Bottom-hole
Riska & Co., Inc.

SAMPLERS, Sewage
Builders Iron Foundry
Central Scientific Co.
International Filter Co.
Scientific Glass Apparatus

SAMPLERS, Silt
Central Scientific Co.

SCALES (See also object of measurement and control)

SCALES, Antimony Test
Howe Scale Co.
Soederer-Kohlbusch, Inc.
Troemner, Henry

SCALES, Automatic
Automatic Scale Co.
Buffalo Scale Co.
Chatillon & Sons
Fairbanks, Morse & Co.
Gump Co.
Howe Scale Co.
International Bus. Mach.
Jacobs Bros. Co., Inc.
Kron Co.
Merrick Scale Mfg. Co.
Richardson Scale Co.
Schaffer Poidometer Co.
Streeter-Amet Co.
Toledo Scale Co.
Triangle Package Mach.
Triner Sales Co.

SCALES, Bag Filling
Automatic Scale Co.
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Gump Co.
Jacobs Bros. Co.
Kron Co.
Richardson Scale Co.
Syntron Company
Toledo Scale Co.
Triangle Package Mach.

SCALES, Basis Weight
Amthor Testing Inst. Co.
Becker, Inc., Christian
Buffalo Scale Co.
Exact Scale Co.
Howe Scale Co.
Kron Co.
Soederer-Kohlbusch
Thwing-Albert Instrument
Toledo Scale Co.
Torsion Balance Co.
Triner Sales Co.

SCALES, Bulk Weighing
Atlas Car & Mfg. Co.
Becker, Inc., Christian
Buffalo Scale Co.
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Howe Scale Co.
Jacobs Bros. Co.
Kron Co.
Merrick Scale Mfg.
Richardson Scale Co.
Schaffer Poidometer Co.
Streeter-Amet Co.
Toledo Scale Co.
Torsion Balance Co.
Triangle Package Mach.
Triner Sales Co.
Troemner, Henry

SCALE, Cement Batching
Buffalo Scale Co.
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Howe Scale Co.
Kron Co.
Richardson Scale Co.
Streeter-Amet Co.
Toledo Scale Co.
Triner Sales Co.

SCALES, Checking
Becker, Inc., Christian
Buffalo Scale Co.
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Jacobs Bros. Co., Inc.
Kron Co.
Merrick Scale Mfg. Co.
Richardson Scale Co.
Toledo Scale Co.
Torsion Balance Co.
Triner Sales Co.

SCALES, Classifying
Exact Weight Scale Co.
Jacobs Bros. Co., Inc.
Kron Co.
Toledo Scale Co.
Triner Sales Co.

SCALES, Computing
Amthor Testing Inst.
International Bus. Mach.
Jacobs Bros., Inc.
Toledo Scale Co.
Triner Sales Co.

SCALES, Continuous Weighing
Buffalo Scale Co.
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Gump Co.
Jacobs Bros. Co.
Jeffrey Mfg. Co.
Kron Co.
Merrick Scale Mfg. Co.
Richardson Scale Co.
Schaffer Poidometer Co.
Streeter Amet Co.
Syntron Company
Toledo Scale Co.
Triangle Package Mach.
United Cinephone Corp.

SCALES, Conveyor
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Howe Scale Co.
International Bus. Mach.
Kron Co.
Merrick Scale Mfg. Co.
Richardson Scale Co.
Schaffer Poidometer Co.
Streeter Amet Co.
Toledo Scale Co.

SCALES, Counting
Amthor Testing Inst. Co.
Buffalo Scale Co.
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Howe Scale Co.
International Bus. Mach.
Jacobs Bros. Co.
Kron Co.
Soederer Kohlbusch
Toledo Scale Co.
Triner Sales Co.
United Cinephone Corp.

SCALES, Crane
Buffalo Scale Co.
Chatillon & Sons
Fairbanks, Morse & Co.
Howe Scale Co.
Kron Co.

SCALES, Dairy
Becker, Inc., Christian
Buffalo Scale Co.
Central Scientific Co.
Chatillon & Sons
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Howe Scale Co.
Humboldt Mfg. Co.
International Bus. Mach.
Jacobs Bros. Co.
Kron Co.
Streeter-Amet Co.
Toledo Scale Co.
Torsion Balance Co.
Triner Sales Co.
Troemner, Henry

SCALES, Differential
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Jacobs Bros. Co., Inc.
Kron Co.
Thwing-Albert Instrument

SCALES, Drawing (See Drawing Instruments)

SCALES, Dump
Buffalo Scale Co.
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Howe Scale Co.
Kron Co.
Toledo Scale Co.

SCALES, Dynamometer
Central Scientific Co.
Chatillon & Sons
Fairbanks, Morse & Co.
Howe Scale Co.
Kron Co.
Martin Decker Corp.
Soederer-Kohlbusch, Inc.
Toledo Scale Co.

SCALES, Estimating
Exact Weight Scale Co.
Jacobs Bros. Co.
Soederer-Kohlbusch, Inc.
Troemner, Henry

SCALES, Grain & Seed Testing
Amthor Testing Inst. Co.
Automatic Scale Co.
Becker, Inc., Christian
Buffalo Scale Co.
Central Scientific Co.
Chatillon & Sons
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Fisher Scientific Co.
Gump Co.
Howe Scale Co.
Jacobs Bros. Co.
Kron Co.
Newark Scale Works
Richardson Scale Co.
Streeter-Amet Co.
Toledo Scale Co.
Torsion Balance Co.
Triangle Package Mach.
Triner Sales Co.
Troemner, Henry

SCALES, Hopper
Atlas Car & Mfg. Co.
Buffalo Scale Co.
Chatillon & Sons
Fairbanks, Morse & Co.
Gump Co.
Howe Scale Co.
Jacobs Bros. Co.
Kron Co.
Richardson Scale Co.
Streeter-Amet Co.
Toledo Scale Co.

SCALES, Laboratory
Becker, Inc., Christian
Buffalo Scale Co.
Central Scientific Co.
Chatillon & Sons
Chicago Apparatus Co.
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Fisher Scientific Co.
Howe Scale Co.
Humboldt Mfg. Co.
International Bus. Mach.
Jacobs Bros. Co.
Microchemical Service
Newark Scale Works
Soederer-Kohlbusch, Inc.
Toledo Scale Co.
Torsion Balance Co.
Troemner, Henry

SCALES, Lorry Car
Atlas Car & Mfg. Co.
Buffalo Scale Co.
Fairbanks, Morse & Co.
Howe Scale Co.
Kron Co.
Richardson Scale Co.
Streeter-Amet Co.
Toledo Scale Co.

SCALES, Loss of Weight
Becker, Inc., Christian
Buffalo Scale Co.
Exact Weight Scale Co.
Jacobs Bros. Co.
Kron Co.
Soederer-Kohlbusch, Inc.
Streeter-Amet Co.
Toledo Scale Co.
Torsion Balance Co.

SCALES, Measuring
Automatic Scale Co.
Howe Scale Co.
Kron Co.
Richardson Scale Co.
Triner Sales Co.

SCALES, Over & Under
Becker, Inc., Christian
Buffalo Scale Co.
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Howe Scale Co.
International Bus. Mach.
Jacobs Bros. Co.
Streeter-Amet Co.
Toledo Scale Co.
Torsion Balance Co.
Triner Sales Co.
Troemner, Henry

SCALES, Packaging
Automatic Scale Co.
Becker, Inc., Christian
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Gump Co.
Howe Scale Co.
Kron Co.
International Bus. Mach.
Jacobs Bros. Co.
Pneumatic Scale Corp.
Richardson Scale Co.
Toledo Scale Co.
Torsion Balance Co.
Triangle Package Mach.
Triner Sales Co.
Troemner, Henry

SCALES, Platform
Becker, Inc., Christian
Buffalo Scale Co.
Chatillon & Sons
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Gump Co.
Howe Scale Co.
Humboldt Mfg. Co.
International Bus. Mach.
Knowles Scale Works
Kron Co.
Streeter-Amet Co.
Toledo Scale Co.
Torsion Balance Co.
Triner Sales Co.

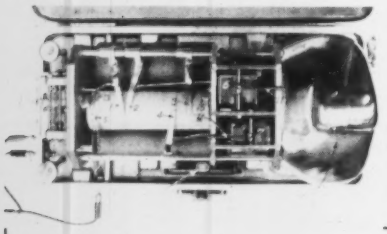
SCALES, Portable
Black & Decker
Buffalo Scale Co.
Central Scientific Co.
Chatillon & Sons
Exact Weight Scale
Fairbanks, Morse & Co.
Gump Co.
Howe Scale Co.
International Bus. Mach.
Jacobs Bros. Co.
Knowles Scale Works
Kron Co.
Richardson Scale Co.
Toledo Scale Co.
Triner Sales Co.

SCALES, Predetermined Weight
Becker, Inc., Christian
Buffalo Scale Co.
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Gump Co.
Howe Scale Co.
International Bus. Mach.
Jacobs Bros. Co.
Merrick Scale Mfg. Co.
Richardson Scale Co.
Schaffer Poidometer Co.
Soederer-Kohlbusch, Inc.
Streeter-Amet Co.
Toledo Scale Co.
Torsion Balance Co.
Triner Sales Co.

SCALES, Recording
Buffalo Scale Co.
Fairbanks, Morse & Co.
Howe Scale Co.
Kron Co.
Merrick Scale Mfg. Co.
Richardson Scale Co.
Streeter-Amet Co.
Toledo Scale Co.
Wallace & Tiernan

SCALES, Remote Indicating
Toledo Scale Co.

SCALES, Rolling Mill
Buffalo Scale Co.
Fairbanks, Morse & Co.
Howe Scale Co.
Kron Co.
Streeter-Amet Co.
Toledo Scale Co.



THE R-S THREE WAY RIDE RECORDER

Also:

R-S TWO WAY RIDE RECORDERS
SAVAGE IMPACT REGISTERS

R-S TIMERS for determining speeds of cars before, during and after impact

and . . .

The NEW R-S Draft Gear Action Recorder—stylus connected directly to Coupler Shank Butt records on chart moving 30 inches per second.

Information on request

Impact Register Co.
Champaign, Illinois

For addresses, see pages 54-58

SCALES, Sacking
(See Scales, Bag-filling)

SCALES, Selecting
Exact Weight Scale Co.
Toledo Scale Co.
United Cinephone Corp.

SCALES, Solder Test
Central Scientific Co.
Soedtner-Kohlbusch, Inc.
Troemner, Henry

SCALES, Steel
Fairbanks, Morse & Co.
Howe Scale Co.
Kron Co.
Streeter-Amet Co.
Toledo Scale Co.

SCALES, Testing
Becker, Inc., Christian
Buffalo Scale Co.
Gump Co.
Howe Scale Co.
Humboldt Mfg. Co.
Jacobs Bros. Co.
Kron Co.
Newark Scale Works
Toledo Scale Co.
Torsion Balance Co.

SCALES, Textile
Becker, Inc., Christian
Buffalo Scale Co.
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Howe Scale Co.
International Bus. Mach.
Kron Co.
Saxl Instrument Co.
Soedtner-Kohlbusch, Inc.
Streeter-Amet Co.
Suter, Alfred
Toledo Scale Co.
Torsion Balance Co.
Triner Sales Co.

SCALES, Track
Buffalo Scale Co.
Fairbanks, Morse & Co.
Howe Scale Co.
Kron Co.
Streeter-Amet Co.
Toledo Scale Co.

SCALES, Truck
Black & Becker
Buffalo Scale Co.
Exact Weight Scale Co.
Fairbanks, Morse & Co.
Streeter-Amet Co.
Toledo Scale Co.

SCALES, Water Meter
Allerdice & Sons
Fairbanks, Morse & Co.
Jacobs Bros. Co.
Kron Co.
Toledo Scale Co.

SCALES, Yardage
Amthor Testing Inst.
Brown & Sharpe
Buffalo Scale Co.
Fairbanks, Morse & Co.
Howe Scale Co.
International Bus. Mach.
Kron Co.
Toledo Scale Co.

SCREENS, Solar Projecting
Ferker, J. W.

SCREENS, X-Ray Fluoroscopic
General Electric X-Ray
Kelley-Koett Mfg. Co.
Patterson Screen Co.
Westinghouse X-Ray Co.

SCREENS, X-Ray Intensifying (See Screens, X-Ray Fluoroscopic)

SEED SIEVE SETS
Ballard Mfg. Co.

SEGER CONES (See Cones, Pyrometric)

SEISMOGRAPHS
Akatos, Inc.
Alpha Instrument Co.
American Inst. Co.
Am. Telescope Labs.
Electrosetting Tables, Inc.
Geophysical Instrument
Heiland Research Corp.
Mac Instrument Co.
Ruska & Co., Inc.

SELF-OPERATING CONTROLLERS & REGULATORS AUTOMATIC
Am. Automatic Elec.
American Inst. Co.
Area Regulators, Inc.
Bailey Meter Co.
Brown Inst. Co.
Cutler Hammer, Inc.
D'Este Co.
Dickson Co.
Elec. Indicator Corp.
Hanlon Waters, Inc.
Lamont & Mann Co.
Leeds & Northrup Co.
Leslie Co.
Mason-Neilan Regulator
Partlow Corp.
Penn Electric Switch Co.
Perfex Corp.
Ruggles-Klingemann
Taplahue Mfg. Co.
Taylor Inst. Cos.
United Transformer

SERVO-MOTORS, Electric Motor
Brown Inst. Co.
Eclipse Aviation
General Regulator Corp.
L. A. B. Corp.

SERVO-MOTORS, Electric Solenoid
Brown Inst. Co.
Eclipse Aviation
Hagan Corp.
Ruggles-Klingemann

SERVO-MOTORS, Hydraulic
Ville Engineers, Mfg. Co.
Askania Regulator Co.
Eclipse-Aviation
General Regulator Corp.
Hagan Corp.
Mason-Neilan Regulator
Ruggles-Klingemann

SERVO-MOTORS, Mechanical
Hagan Corp.

SERVO-MOTORS, Pneumatic
Askania Regulator Co.
Brown Inst. Co.
Hagan Corp.
Mason-Neilan Regulator

SEXTANTS
Alpha Instrument Co.
Kniffel & Esser Co.
Master Optical Co.
Negus, T. S. & J. D.
Pioneer Instrument Co.
Warren Knight Co.
White Co., Inc.

SHIP LOGS
Elec. Tachometer Corp.
Kenyon Instrument Co.
Negus, T. S. & J. D.
Pitometer Log Corp.

SHUNT METERS (See Meters, Shunt)

SHUNTS
Burton Rogers Co.
Columbia Elec. Mfg.
Esterline Angus Co.
General Elec. Co.
Hickok Elec. Inst. Co.
International Resistance
Precision Resistor Co.
Radio City Products Co.
Rawson Electrical Inst.
Roller-Smith Co.
Rubicon Co.
Scientific Research Inst.
Triplett Electrical Inst.
West Inghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

SIEVE SHAKERS
Braun Corp.

SIEVES, TESTING
American Inst. Co.
Central Scientific Co.
Dietert Co.
Fisher Scientific Co.
Humboldt Mfg. Co.
Precision Scientific Co.
Riehle Division
Scientific Inst. Co.
Weber Brothers Metal

SIGHT METERS
General Elec. Co.
G-M Labs
Weston Elec. Inst. Corp.

SIGHTS, GUN, Telescopic
Clark & Sons
Ferker, J. W.
Kollmorgen Optical Co.
Perkin, Elmer & Moffitt
Zeiss, Inc., Carl

SIGNAL GENERATORS (See Generators, Signal)

SIGNALING DEVICES, Automatic
American Automatic Elec.
Autocall Co.
Ballard Co.
Cincinnati Time Rec.
Elec. Indicator Corp.
Foxboro Co.
General Elec. Co.
Guardian Elec. Mfg. Co.
International Bus. Mach.
Leslie Co.
Production Instrument
Southern Electronics Labs.
Stance Engineering Co.
Thompson Clock Co.
United Cinephone Corp.

SIGNALING DEVICES, Traffic
Am. Gas Accumulator
Ballard Co.
Eagle Signal Corp.
Sangamo Electric Co.
Southern Electronics Labs.

SILICA, VITREOUS
Thermal Syndicate, Ltd.

SINE BARS
Ford Motor Co.

SLIDE RULES (See Drawing Instruments)

SLIDING GAGES (See Gages, Sliding)

SLOW MOTION STUDY EQUIPMENT
Auto-Flow
Commercial Engg. Labs.
Warren Television Co.

SLUMP CONES (See Cones, Slump)

SMOKE DENSITY, Indicators & Recorders
Associated Research
Bailey Meter Co.
Bogle Room Equip.
Bristol Co.
Denver Fire Clay Co.
Dickson Co.
Electronic Lab.
Ess Instrument Co.
General Elec. Co.
General Television Corp.
Leeds & Northrup Co.

SMOKE DENSITY Indicators & Recorders (Cont'd)
Lancaster Elec. Co.
Luxtrol Co., Inc.
McNeill Eng. Equip.
Photoswitch Corp.
Photovolt Inc.
Precision Utilities Mfg.
Scientific Electronics Lab.
United Cinephone Corp.
Weston Elec. Inst. Corp.

SOLAR PROJECTING SCREEN (See Screen, Solar Projecting)

SOUND INDICATORS & ANALYZERS (See Indicators, Sound & Analyzers, Sound)

SOUND LEVEL METERS
Ballantine Labs.
Clough-Brengle Co.
Daven Co.
Electrical Research Prod.
Electronic Design Corp.

SOUND LEVEL METERS
General Elec. Co.
General Radio Co.
Precision Apparatus Corp.
Radio City Products Co.
Shallcross Mfg. Co.
Triplett Electrical Inst.
West Inghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

SOUNDING LEADS
Ballard Mfg. Co.
Bliss & Co.
Kenyon Instrument Co.
Moeller Instrument Co.
Negus, T. S. & J. D.

SOUNDING MACHINES
Ballard Mfg. Co.
Bendix Marine Products
Kenyon Instrument Co.
Moeller Instrument Co.
Negus, T. S. & J. D.
Submarine Signal Co.

SOUNDING TUBES
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Kimble Glass Co.
Moeller Instrument Co.
Negus, T. S. & J. D.

SPECIFIC GRAVITY, Indicators & Recorders
American Meter Co.
Bailey Meter Co.
Brinkley Co.
Ermer & Amend

SPECIFIC GRAVITY, Indicators & Recorders (Cont'd)
Foxboro Co.
Refinery Supply Co.
Ruchti Co.
Schultheis Corp.
Scientific Inst. Co.
Taplahue Mfg. Co.
Taylor Inst. Cos.

SPECTRA DEMONSTRATORS
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Central Scientific Co.
Eastern Science Co.
Fisher Scientific Co.
Gaertner Scientific Corp.

SPECTRAL TUBES CONTAINING RARE GASES (See Spectrum Tubes)

SPECTROGRAPHS
Akatos, Inc.
Bausch & Lomb Optical
Bruker Co.
Gaertner Scientific Corp.
Spencer Lens Co.
Zeiss, Inc., Carl

SPECTROGRAPHS, Diffraction Grating
Applied Research Lab.

SPECTROGRAPHS, Oscillating
Heavy Scientific Apparatus

SPECTROGRAPHS, Vacuum
Baird Associates
Central Scientific Co.
Dietert Co.
Ferker, J. W.
Fisher, Inc.

SPECTROGRAPHS, X-ray
Central Scientific Co.
Fisher, Inc.
Gaertner Scientific
General Electric X-Ray
Hayes Scientific Apparatus
Kelley-Koett Mfg.

SPECTROMETERS
Akatos, Inc.
American Askania Corp.
Bausch & Lomb Optical
Fisher, Inc.
Spencer Lens Co.

SPECTROMETER, Infra Red
Gaertner Scientific Corp.

SPECTROMETERS X-RAY (See Spectrographs, X-Ray)

SPECTRO-PHOTOMETERS (See Photometers, Spectro)

SPECTROSCOPES
Akatos, Inc.
American Askania Corp.
Gaertner Scientific Corp.
Leeds, Inc.
Spencer Lens Co.

SPECTROSCOPE, Quartz
Gaertner Scientific Corp.

SPECTROSCOPES, Stellar
Am. Telescope Labs.
Central Scientific Co.
Eastern Science Co.
Ferker, J. W.
Mare Instrument Co.
Perkin, Elmer & Moffitt
Zeiss, Inc., Carl

SPECTRUM TUBES
Central Scientific Co.
Fisher, Inc.
Gaertner Scientific Corp.
General Electric Co.

SPEED Indicators
Amthor Testing Inst. Co.
Bailey Meter Co.
Biddle Co., Jas. G.
Boulin Instrument Corp.
Brown Inst. Co.
Commercial Engg. Labs
Control Systems, Limited
Cramer & Co., Inc.
Electric Speed Ind. Co.
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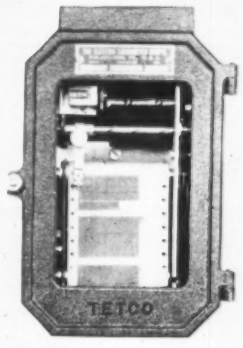
Stancraft Co.
Stucht & Co.
Veeder-Root, Inc.
Wagner Elec. & Mfg.
Weston Elec. Inst. Corp.
Zenith Co., The

TETCO
Speed Recorder



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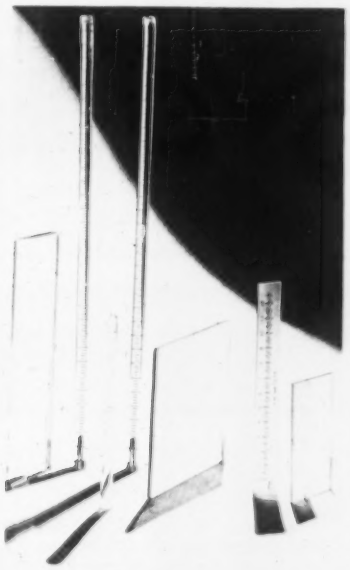

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For addresses, see pages 54-58

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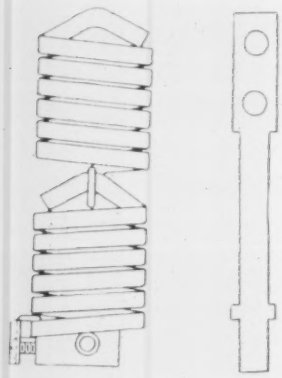

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General Elec. Co.
Stewart-Warner Corp.
Westinghouse Elec. & Mfg.

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Central Scientific Co.
Fish-Schurman Co.
Gaertner Scientific Corp.

SPHYGMOMANOMETERS
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Central Scientific Co.
Heilige, Inc.
Precision Therm. & Inst.
Taylor Inst. Cos.

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Brown & Sharpe
Micro-Instrument Co.
Starrett Co.
Union Tool Co.
Warren Knight Co.

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Heilige, Inc.
Munsell Color Co.

STANDARDS, E.m.f.
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Leeds & Northrup Co.
Rubicon Co.

STANDARDS, Frequency
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Ferris Inst. Corp.
General Radio Co.

STANDARDS, Inductance
Cambridge Inst. Co.
General Radio Co.
Leeds & Northrup Co.
Rubicon Co.

STANDARDS, Length
Gaertner Scientific Corp.
Gurley, W. & L. E.
Van Keuren Co.

STANDARDS, Mass
Gurley, W. & L. E.
Sonderer-Kohlbusch, Inc.

STANDARDS, Potential
Leeds & Northrup Co.
Rubicon Co.

STANDARDS, Pressure
Green, Henry J.
Holz, Herman A.
Precision Therm. & Inst.

STANDARDS, Resistance
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General Radio Co.
Leeds & Northrup Co.
Rubicon Co.
Shallcross Mfg. Co.
Sticht & Co.

STANDARDS, Sound Level
General Radio Co.

STANDARDS, Temperature
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Leeds & Northrup Co.
Moeller Instrument Co.
Precision Therm. & Inst.

STANDARDS, Time
Gaertner Scientific Corp.
General Radio Co.
Standard Elec. Time Co.

STANDARDS, Volume
Gurley, W. & L. E.

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Allis-Chalmers Mfg. Co.
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Eclipse Aviation
General Elec. Co.
Monitor Controller Co.
Penn Electric Switch Co.
Schaefer Bros. Co.
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American Meter Co.
Area Regulators, Inc.
Elec. Indicator Corp.
General Elec. Co.

STEAM METERS (See Flow Meters, Steam)

STEEL TAPES (See Tapes, Steel)

STELLAR SPECTROSCOPES (See Spectroscopes, Stellar)

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Kelley Koett Mfg. Co.
Westinghouse X Ray Co.

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Bruel Development Co.
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Warren-Knight Co.
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STRAIN GAGES (See Gages, Strain)

STRAIN TESTERS, GLASS (See Testers, Stress (Glass)

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Holz, Herman A.

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Morey & Jones, Ltd.

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Cambridge Inst. Co.
Holz, Herman A.
Martin Decker Corp.
Riehle Div.

STRESS-STRAIN, Indicators
Ames Co., B. C.
Baldwin-Southwark Corp.
Holz, Herman A.

STRESS-STRAIN, Recorders
Baldwin-Southwark Corp.
Cambridge Inst. Co.
Holz, Herman A.
Olsen Testing Machine
Riehle Div.

STROBOSCOPES
Commercial Engg. Labs.
L. A. B. Corp.
Welch Mfg. Co.
Westinghouse Elec. & Mfg.
Zeiss, Inc., Carl

SULPHUR BOMBS (See Bombs, Sulphur)

SULPHUR DIOXIDE, Indicators (See Gas Analyzers, Sulphur Dioxide) **Recorders** (See Gas Analyzers, Sulphur Dioxide)

SUNSHINE, Indicators & Recorders
Cambridge Inst. Co.
Esterline-Angus Co.
Friez & Sons
Fuess, Inc.
G. M. Mfg. Co., Inc.
Leeds & Northrup Co.
Luxtrol Co., Inc.
Sonyo n Electronics Labs.
Taylor Inst. Cos.
White Co., Inc.

SUPERVISORY CONTROL EQUIPMENT
American Automatic Elec.
Autocall Co.
Bristol Co.
Cramer & Co., Inc.
General Elec. Co.
Guardian Elec. Mfg. Co.
Leeds & Northrup Co.
Sonyo n Electronics Labs.
Taglıabue Mfg. Co.

SURFACE GAGES (See Gages, Surface)

SURFACE PLATES, GLASS
Bausch & Lomb Optical
Clark & Sch.
Fecker, J. W.
Fish-Schurman Co.
Zeiss, Inc., Carl

SURGE CREST AMMETERS (Ammeters, Surge-Crest)

SURGE, Indicators & Recorders
Elec. Indicator Corp.
General Elec. Co.
Esterline-Angus Co.

SURVEYING INSTRUMENTS
Alpha Instrument Co.
Beekman Co.
Berger & Sons
Bliss & Co.
Boerner Co.
Gurley, W. & L. E.
Kenyon Instrument Co.
Kern Co.
Keuffel & Esser Co.
Kolesch & Company
Leitold, Voltel & Co.
Pittsburgh Inst. & Mach.
Post Co., Frederick
Speedometer Service Co.
Spedden & Co.
J. C. Umer Co.
United States Blue Print
Warren Knight Co.
Weber Co.
White Co., Inc.
Zeiss, Inc., Carl

SURVEYING INSTRUMENTS, Aneroids
Am. Paulin System

SURVEYING INSTRUMENTS, Underground, for wells or bore holes
H. Cole Co.
Brittmeters, Inc.
Engineering Labs., Inc.
Geophysical Inst., Co.
Halliburton Oil Well
Sperry-Sun Well Survey
Warren Knight Co.
David White Co., Inc.

SURVEYOR'S CHAINS (See Surveying Instruments)

SWITCHES, Automatic Transfer
Allen-Bradley Co.
Andrew, V. & J. M.
Arrow Hart & Hegeman
Autocall Co.
Automatic Switch Co.
Cramer & Co., Inc.
Cutler-Hammer, Inc.
General Elec. Co.
Hart Mfg. Co.
Monitor Controller Co.
Ward Leonard Elec. Co.
Zenith Electric Co.

SWITCHES, Instrument
Autocall Co.
Furnas Electric Co.
General Elec. Co.
Kellogg Switchboard
Rubicon Co.
Sensitive Research Inst.
Thwing-Albert Instrument
Triplett Elec. Inst. Co.
Weston Elec. Inst. Corp.

SWITCHES, Magnetic
Allen-Bradley Co.
Arrow Hart & Hegeman
Autocall Co.
Automatic Switch Co.
Cutler-Hammer, Inc.
General Elec. Co.
Guardian Elec. Mfg. Co.
Hart Mfg. Co.
Industrial Engr. Corp.
Monitor Controller Co.
Penn Electric Switch
Perfex Corp.
Struthers-Dunn
Ward Leonard Elec. Co.
Zenith Electric Co.

SWITCHES, Mercury
Arrow Hart & Hegeman
Continental Elec. Co.
Elec. Switch Corp.
General Elec. Co.
Gen. Elec. Vapor Lamp
Hart Mfg. Co.

SWITCHES, Pyrometer
Lewis Engg. Co.
Sonyo n Electronics Labs.
Taglıabue Mfg. Co.
Thwing-Albert Inst. Co.
Weston Elec. Inst. Corp.

SWITCHES, Relay
Allen-Bradley Co.
Andrew, Victor J.
Amer. Automatic Elec.
Arrow-Hart & Hegeman

SWITCHES, Relay (Cont'd)
Autocall Co.
Automatic Switch Co.
Cutler-Hammer, Inc.
Eclipse Aviation
Friez & Sons
General Controls Co.
General Elec. Co.
Guardian Elec. Mfg. Co.
Hart Mfg. Co.
Industrial Engr. Corp.
Kellogg Switchboard
Monitor Controller Co.
Penn Electric Switch
Perfex Corp.
Standard Elec. Prods.
Struthers-Dunn
Ward Leonard Elec. Co.
Zenith Electric Co.

SWITCHES, Rotary
Amer. Automatic Elec.
Arrow Hart & Hegeman
Autocall Co.
Furnas Electric Co.
General Elec. Co.
Guardian Elec. Mfg. Co.
Hart Mfg. Co.
Leonard Elec. Mfg. Co.
Lewis Engg. Co.
Rubicon Co.
Sensitive Research Inst.
Shallcross Mfg. Co.
Taglıabue Mfg. Co.
Thwing-Albert Inst. Co.
Triplett Electrical Inst.
Weston Elec. Inst. Corp.

SWITCHES, Snap
Arrow Hart & Hegeman
Cutler-Hammer, Inc.
General Elec. Co.
Hart Mfg. Co.
Micro Switch Corp.
Perfex Corp.
Ward Leonard Elec. Co.

SWITCHES, Time
American Timer Corp.
Anderson, A. & J. M.
Autocall Co.
Automatic Elec. Mfg.
Cramer & Co., Inc.
Diebold Safe Co.
Eagle Signal Corp.
Froher-Faybor Co.
General Elec. Co.
Guardian Elec. Mfg. Co.
Industrial Engr. Corp.
Industrial Instrument Co.
Landis & Gyr, Inc.
Paragon Electric Co.
Penn Electric Switch
Perfex Corp.
Rhodes, Inc., M. H.
Sangamo Electric Co.
Stahl Co.
Thomas Clock Co., Seth
Thompson Clock Co.
Thrush & Co.
Walser Automatic Timer
Ward Leonard Elec. Co.
Zenith Electric Co.

SYNCHRONIZATION FORKS, Electrical (See Forks, Synchronization)

SYNCHRONOUS MOTORS (See Motors, Synchronous)

SYNCHROSCOPES
Allis-Chalmers Mfg. Co.
Eclipse Aviation
Electric Controller
General Elec. Co.
Hickok Elec. Inst. Co.
Kollman Inst. Co.
Roller-Smith Co.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

TACHOGRAPHS
Amthor Testing Inst.
Biddle Co., Jas. G.
Coats Mach. Tool Co.
Cramer & Co., Inc.
Olmer Register Co.
Zeiss, Inc., Carl
Zernickow Co., O.

TACHOMETER TESTERS (See Testers, Tachometer)

TACHOMETERS, Centrifugal
Amthor Testing Inst. Co.
Barbour Stockwell Co.
Biddle Co., Jas. G.
Boulin Instrument Corp.
Coats Mach. Tool Co.
Consol. Ashcroft Hancock
Corbin Screw Corp.
Durant Mfg. Co.
Elec. Tachometer Corp.
Foxboro Co.
Hays Corp.
Ideal Metrola Sales
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Pioneer Instrument Co.
Schertz Co., Inc.
Stewart-Warner Corp.
Sticht & Co.
Veeder-Root, Inc.
Viking Instrument Co.
Zernickow Co., O.

For addresses, see pages 54-58

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Elec. Tachometer Corp.
Elgin Nat'l Watch Co.
Hasler-Tel Co.
Jaeger Watch Co.
Pierce Watch Co.
Scherr Co., Inc.
Standard Elec. Time
Sticht & Co.
Stoner Lantz Co.
Zeitnickow Co., O.

TACHOMETERS, Crosspendulum
Amthor Testing Inst.
Biddle Co., Jas. G.
Coats Mach. Tool Co.
Sticht & Co.
Zeitnickow Co., O.

TACHOMETERS, Electric
Allen Elec. & Equip.
Bristol Co.
Brown Inst. Co.
Electric Speed Ind. Co.
Elec. Tachometer Corp.
Esterline-Angus Co.
General Elec. Co.
Hickok Elec. Inst. Co.
Hy-Ef Electrical Prods.
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Pioneer Instrument Co.
Pittsburgh Log Corp.
Pyrco Co.
Scherr Co., Inc.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.
Zip Abrasive Co.

TACHOMETERS, Electromagnetic
Cummings Mach. Works
Jaeger Watch Co.
Kollman Inst. Co.
National Instrument Co.
Standard Elec. Time Co.
Stewart-Warner Corp.
Zeitnickow Co., O.

TACHOMETERS, Fly-ball
Biddle Co., Jas. G.
Coats Mach. Tool Co.
Elec. Tachometer Corp.
Jones Motrola Sales
Sticht & Co.
Viking Instrument Co.

TACHOMETERS, Portable
Amthor Testing Inst. Co.
Biddle Co., Jas. G.
Boulin Instrument Corp.
Cutsol-Ashcroft-Hancock

TACHOMETERS, Portable (Cont'd.)
Custin Screw Corp.
Elec. Tachometer Corp.
Foxboro Co.
Hasler-Tel Co.
Jones Motrola Sales
Martindale Electric Co.
Sticht & Co.
Viking Instrument Co.

TACHOMETERS, Speed Limit Control
Barbour-Stockwell Co.

TACHOMETERS, Stroboscopic
Boulin Instrument Corp.
Coats Mach. Tool Co.
General Radio Co.
L. A. B. Corp.
Stewart-Warner Corp.

TACHOMETERS, Tilting-ring
Amthor Testing Inst. Co.
Coats Mach. Tool Co.

TACHOMETERS, Vibrating Reed
Biddle Co., Jas. G.

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Biddle Co., Jas. G.
Scherr Co., Inc.
Sticht & Co.
Zeitnickow Co., O.

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Ballard Mfg. Co.

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TAPES, Steel
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Kouffel & Esser Co.
Soltmann, Inc.
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Starrett Co.
United States Blue Print
Watson-Knight Co.
White Co., Inc.

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Kollmorgen Optical Co.
Kouffel & Esser Co.
Pierce Watch Co.

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Fecker, J. W.
Kouffel & Esser Co.
Kollmorgen Optical Co.
Perkin, Elmer & Moffitt
Scherr Co., Inc.
White Co., Inc.

TELESCOPES, Astronomical
Am. Telescope Labs.
Clark & Sons
Eastern Science Co.
Fecker, J. W.
Gaertner Scientific Corp.
Kern Co.
Muse Instrument Co.
Perkin, Elmer & Moffitt
Tinsley Labs.
Zeiss, Inc., Carl

TELESCOPES, Azimuth
Am. Telescope Labs.
Clark & Sons
Fecker, J. W.
Gaertner Scientific Corp.
Kern Co.
Kollmorgen Optical Co.
Perkin, Elmer & Moffitt
Tinsley Labs.
Warren Knight Co.
Warner & Swasey Co.
Zeiss, Inc., Carl

TELESCOPES, Bore-, Inspection
Am. Telescope Labs.
Kollmorgen Optical Co.
Perkin, Elmer & Moffitt
Scherr Co., Inc.
Zeiss, Inc., Carl

TELESCOPES, Laboratory
Gaertner Scientific Corp.

TELESCOPES, Reflecting
Am. Telescope Labs.
Clark & Sons
Fecker, J. W.
Fish-Schurman Co.
Perkin, Elmer & Moffitt
Tinsley Labs.
Warner & Swasey Co.
Zeiss, Inc., Carl

TELESCOPES, Refracting
Am. Telescope Labs.
Clark & Sons
Fecker, J. W.
Fish-Schurman Co.
Kern Co.
Kouffel & Esser Co.
Perkin, Elmer & Moffitt
Tinsley Labs.
Warner & Swasey Co.
Wallenak Optical Co.
Zeiss, Inc., Carl

TELESCOPES, Zenith
American Askania Corp.
Am. Telescope Labs.
Clark & Sons
Fecker, J. W.
Gaertner Scientific Corp.
Kern Co.
Perkin, Elmer & Moffitt
Zeiss, Inc., Carl

TENSIOMETERS
Boulin Instrument Corp.
Central Scientific Co.
Geophysical Inst. Co.
Holz, Herman A.
Olsen Testing Machine
Suter, Alfred
Toledo Scale Co.

TENSION INDICATORS
Martin-Decker Corp.
Stoelzer-Kobliusch, Inc.

TENSION INDICATORS, Textile
Boulin Instrument Corp.
Holz, Herman A.

TEST BLOCKS
Detroit Testing Mach. Co.
Ford Motor Co.
Holz, Herman A.

TEST BLOCKS (Cont'd.)
Motor Devices Co.
Steel City Testing Lab.
Van Keuren Co.

TEST WEIGHTS (See Weights, Test)

TEST WELLS
Palmer Co.

TESTERS & TESTING MACHINES (See also object of measurement and control)

TESTERS & TESTING MACHINES, Abrasion
Amthor Testing Inst. Co.
Atlas Elec. Devices Co.
Fidelity Mach. Co.
Holz, Herman A.
Morehouse Machine Co.
Olsen Testing Machine
Riehle Div.
Saxl Inst. Co.
Stewart Engineering Co.
Suter, Alfred
Taber Instrument Co.
Testing Machines, Inc.
Zahr, Inc., Henry

TESTERS & TESTING MACHINES, Absorption
Gurley, W. & L. E.

TESTERS & TESTING MACHINES, Air Speed Indicator (See Air-speed Indicator Testers)

TESTERS & TESTING MACHINES, Alternating Stress
Brush Development Co.
Emery Co.
Holz, Herman A.
Krause Fatigue Machine
Olsen Testing Machine
Riehle Div.
Suter, Alfred

TESTERS & TESTING MACHINES, Altimeter (See Altimeter Testers)

TESTERS & TESTING MACHINES, Armature-Dial Commutator Dresser

TESTERS & TESTING MACHINES, Asphalt
American Inst. Co.
Beam Corp.
Central Scientific Co.
Chatillon & Sons
Fish-Schurman Co.
Fisher Scientific Co.
Humboldt Mfg. Co.
Philadelphia Thermometer
Precision Scientific Co.
Riehle Div.
Taglabue Mfg. Co.
Varga Engineering Co.
Western Machinery Co.

TESTERS & TESTING MACHINES, Axle
Sperry Products, Inc.

TESTERS & TESTING MACHINES, Ball Bearing (See Testers, Bearing)

TESTERS & TESTING MACHINES, Battery
Allen Elec. & Equip. Co.
Burton Electric Co.
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Hickok Elec. Inst. Co.
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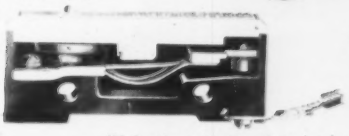

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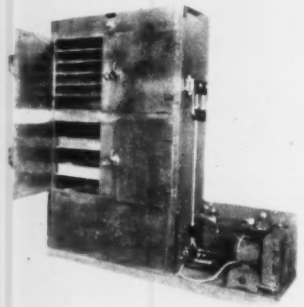

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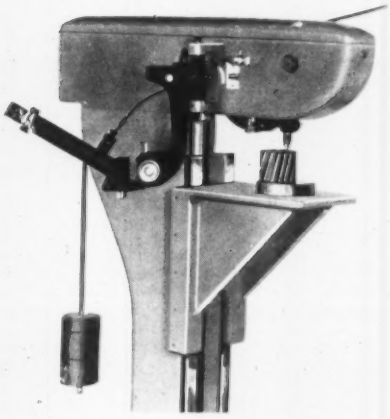

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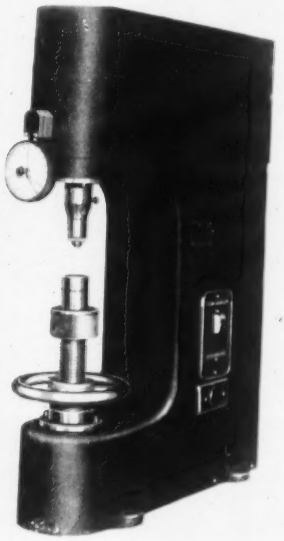

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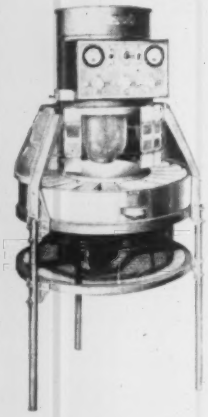

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Suter, Alfred
Steel City Testing
Testing Machines, Inc.
Thwing-Albert Inst. Co.
Toledo Scale Co.

TESTERS & TESTING MACHINES, Tensile (very light load)
Amthor Testing Inst.
Boulin Instrument Corp.
Dietert Co.
Ferner Co.
Holz, Herman A.
Olsen Testing Machine
Steel City Testing Lab.
Suter, Alfred
Testing Machines, Inc.
Thwing-Albert Inst. Co.
Toledo Scale Co.

TESTERS & TESTING MACHINES, Textile
American Inst. Co.
Atlas Elec. Devices Co.
Brown Inst. Co.
Holz, Herman A.
Perkins & Son
Saxl Inst. Co.
Suter, Alfred
Taber Instrument Co.
Thwing-Albert Inst. Co.

TESTERS & TESTING MACHINES, Thermometer
Amthor Testing Inst.
Brown Inst. Co.
Consol. Ashcroft Hancock
Fuess, Inc.
Green, Henry J.
Huddleston, J. S. F.
Moeller Instrument Co.
Ruehfel Co.
Schaffhaus Corp.
Tagliabue Mfg. Co.
Thwing-Albert Inst. Co.

TESTERS & TESTING MACHINES, Thread
Boulin Instrument Corp.
Holz, Herman A.
Saxl Inst. Co.
Suter, Alfred
Thwing-Albert Inst. Co.

TESTERS & TESTING MACHINES, Torsion
Baldwin-Southwark Corp.
Boulin Instrument Corp.
Detroit Testing Mach.
Emery Co.
Hayes Scientific App.
Holz, Herman A.
Olsen Testing Machine
Riehle Div.
Saxl Inst. Co.
Steel City Testing
Suter, Alfred
Testing Machines, Inc.
Toledo Scale Co.

TESTERS & TESTING MACHINES, Torsional Creep
Baldwin-Southwark Corp.
Holz, Herman A.
Suter, Alfred

TESTERS & TESTING MACHINES, Turn Indicator
Amthor Testing Inst. Co.
Ruehfel Co.

TESTERS & TESTING MACHINES, Universal
Amthor Testing Inst. Co.
Detroit Testing Mach.
Holz, Herman A.
Olsen Testing Machine
Riehle Div.
Steel City Testing Lab.

TESTERS & TESTING MACHINES, Vapor Transmission
Thwing-Albert Inst. Co.

TESTERS & TESTING MACHINES, Varnish
Atlas Elec. Devices Co.
Eimer & Amend
Fish-Schurman Co.
Hellige, Inc.
Taber Instrument Co.
Zahr, Inc., Henry

TESTERS & TESTING MACHINES, Vibration
Brush Development Co.

TESTERS & TESTING MACHINES, Voltage
Allen Elec. & Equip.
Associated Research
Clough-Brengle Co.
General Elec. Co.
Norton Electrical Inst.
Potter Co.
Shallcross Mfg. Co.
Weston Elec. Inst. Corp.

TESTERS & TESTING MACHINES, Water Meter
Badger Meter Co.
Ford Meter Box Co.
Neptune Meter Co.
Toledo Scale Co.

TESTERS & TESTING MACHINES, Water Penetration
Thwing-Albert Inst. Co.

TESTERS & TESTING MACHINES, Water Rate
Paulson & Co.

TESTERS & TESTING MACHINES, Watthour Meter
Elec. Facilities Inc.
General Elec. Co.
Sangamo Electric Co.
Standard Elec. Time
States Co.
Western Electro-Mech.
Westinghouse Elec. & Mfg.

TESTERS & TESTING MACHINES, Weathering
Atlas Elec. Devices Co.
Gen. Elec. Vapor Lamp

TESTERS & TESTING MACHINES, Wire
Amthor Testing Inst. Co.
Baldwin-Southwark Corp.
Holz, Herman A.
Krouse Fatigue Mach.
Olsen Testing Machine
Riehle Div.
Saxl Inst. Co.
Steel City Testing
Suter, Alfred
Taber Instrument Co.

TESTERS & TESTING MACHINES, Yarn
Atlas Elec. Devices Co.
Brown Inst. Co.
Emerson Apparatus Co.
Hays Laboratories
Holz, Herman A.
Saxl Inst. Co.
Suter, Alfred
Testing Machines, Inc.

TESTING INSTRUMENTS OPTICAL
Akatos, Inc.
American Askania Corp.
Am. Telescope Labs.
Bausch & Lomb Optical
Gaertner Scientific Corp.
Jones & Lamson Machine
Fuess, Inc.
Kollmorgen Optical Co.
Leitz, Inc.
Spencer Lens Co.

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RUBBER
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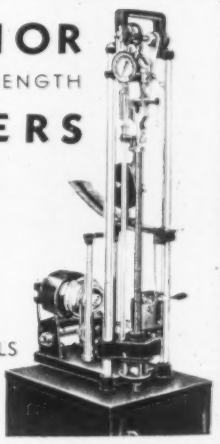
FLAT MATERIALS



PAPER FOLDING ENDURANCE TESTER
BURSTING TESTER
MICROMETERS (POCKET and DESK)
PAPER BASIS WEIGHT SCALES
CORDAGE SCALES
ALUMINUM FOIL SCALES
COMPUTING SCALES
RUBBER ABRASION TESTER
DEAD WEIGHT
PRESSURE GAUGE TESTER
TACHOMETERS
INDICATING and RECORDING
MERCURY COLUMN GAUGES

AMTHOR
TESTING INSTRUMENT CO. INC.
6 LEO PLACE BROOKLYN, N. Y.

For addresses, see pages 54-58

TESTING MACHINES, UNIVERSAL, Dead weight beam, Capacities 0-100 lb.
Dietert Co.
Holz, Herman A.
Olsen Testing Machine
Saxl Inst. Co.

TESTING MACHINES, UNIVERSAL, Dead Weight Beam, Capacities 100-5000 lb.
Holz, Herman A.
Olsen Testing Machine
Riehle Div.

TESTING MACHINES, UNIVERSAL, Dead weight beam, Capacities 5000-100,000 lb.
Olsen Testing Machine
Riehle Div.

TESTING MACHINES, UNIVERSAL, Dead weight beam, Capacities over 100,000 lb.
Baldwin Southwark Corp.
Olsen Testing Machine
Riehle Div.

TESTING MACHINES, UNIVERSAL, Pendulum, Capacities 0-100 lb.
Dietert Co.
Holz, Herman A.
Olsen Testing Machine
Riehle Div.
Saxl Inst. Co.
Steel City Testing
Suter, Alfred

TESTING MACHINES, UNIVERSAL, Pendulum, Capacities 100-5000 lb.
Dietert Co.
Holz, Herman A.
Olsen Testing Machine
Riehle Div.
Steel City Testing
Suter, Alfred
Testing Machines, Inc.

TESTING MACHINES, UNIVERSAL, Pendulum, Capacities 5000-100,000 lb.
Holz, Herman A.
Olsen Testing Machine
Riehle Div.
Steel City Testing
Suter, Alfred

TESTING MACHINES, UNIVERSAL, Pendulum, Capacities over 100,000 lb.
Holz, Herman A.
Olsen Testing Machine
Riehle Div.
Steel City Testing
Suter, Alfred

TESTING MACHINES, UNIVERSAL, Spring Dynamometers, Capacities 0-100 lb.
Baldwin Southwark Corp.
Holz, Herman A.
Saxl Inst. Co.

TESTING MACHINES, UNIVERSAL, Spring Dynamometers, Capacities 100-5000 lb.
Baldwin Southwark Corp.
Dietert Co.
Holz, Herman A.

TESTING MACHINES, UNIVERSAL, Spring Dynamometers, Capacities 5000-100,000 lb.
Baldwin Southwark Corp.
Holz, Herman A.
Riehle Div.

TESTING MACHINES, UNIVERSAL, Spring Dynamometers, Capacities over 100,000 lb.
Baldwin Southwark Corp.
Holz, Herman A.

TESTING SETS (See also object of measurement and control)

TESTING SETS, Alcohol
G. M. Mfg. Co., Inc.
Precision Therm. & Inst.
Rochester & Betzold
Riehle Co.
Scientific Glass App.
Taglabue Mfg. Co.

TESTING SETS, Automotive
Clough-Brengle Co.
Engelhard, Chas.
Gow-Mac Instrument
Hays Corp.
Hy-Ef Electrical Prod.
Nichols & Co.
Porter Co.

TESTING SETS, Current Transformer
Eastern Specialty Co.
Elec. Facilities Inc.
R bicon Co.
West. Electro-Mechanical

TESTING SETS, Electrical
American Automatic Elec.
American Transformer
Associated Research
Clough-Brengle Co.
Columbia Elec. Mfg.
General Elec. Co.
Industrial Inst. Inc.
Meier Devices Co.
RCA Manufacturing Co.
Rubicon Co.
Shallcross Mfg. Co.
Stright & Co.
Tele-Dynamometer Corp.
West. Electro-Mechanical
Weston Elec. Inst. Corp.

TESTING SETS, Electrical Thermometer
Brown Inst. Co.
Shallcross Mfg. Co.
Thwing-Albert Instrument

TESTING SETS, Ground Resistance
Am. Automatic Electric
Associated Research
Biddle Co., Jas. G.
Industrial Inst. Inc.
Rubicon Co.
Schaevitz Research Inst.
Stright & Electrical Labs.
Stright & Co.

TESTING SETS, Line Current
Associated Research
Columbia Elec. Mfg.
Elec. Facilities, Inc.
General Elec. Co.
Meier Devices Co.
Roller-Smith Co.
West. Electro-Mechanical
Weston Elec. Inst. Corp.

TESTING SETS, Meters, Electrical
Associated Research
Clough-Brengle Co.
Eastern Specialty Co.
Elec. Facilities, Inc.
General Elec. Co.

TESTING SETS, Meters, Electrical (Gen.)
RCA Manufacturing Co.
Schaevitz Research Inst.
Shallcross Mfg. Co.
Stright & Co.
Weston Elec. Inst. Corp.

TESTING SETS, Meters, Fluid
Bailey Meter Co.
Brown Inst. Co.
Taglabue Mfg. Co.

TESTING SETS, Portable Combustion
Bayer Mfg. Co.
Engelhard, Chas.
Friez & Sons
Gow-Mac Instrument
Hays Corp.
Porter Co.

TESTING SETS, Potential Transformer
Eastern Specialty Co.
Elec. Facilities, Inc.
Leeds & Northrup Co.
Raytheon Mfg. Co.

TESTING SETS, Telephone
American Automatic Electric
Shallcross Mfg. Co.

TESTING SETS, Water
Electric Softener Corp.
Industrial Inst. Inc.
Scientific Glass App.

TESTING SIEVE SHAKER
Norton Wire Cloth Co.

TESTING SIEVES
Norton Wire Cloth Co.

THEODOLITES (See Surveying Instruments)

THERMIONIC RECTIFIERS (See Rectifiers, Thermionic)

THERMO-AMMETERS (See Ammeters, Thermo)

THERMOCOUPLES, Base-Metal
Bacharach Industrial Inst.
Bristol Co.
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Use the easier-to-read Industrial Thermometer with BINOC Tubing

BINOC Tubing provides industrial thermometers that are much easier to read, without squinting . . . with both eyes open. This new tubing, with its newly-designed, optically correct construction, makes possible a thermometer with more than double the angle of vision, within which the mercury column is clearly visible. It gives two to five times greater visibility than previous thermometers. It eliminates tricky bore reflections that cause inaccurate readings or waste time of employees.

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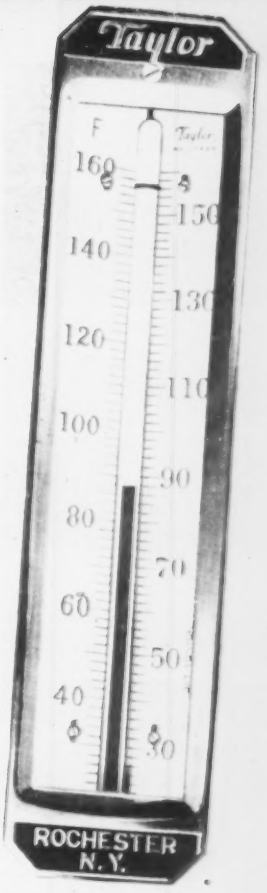

Types of Taylor Mercury-in-Glass Thermometers

Taylor makes a complete line of mercury-in-glass thermometers for every purpose, including Etched Stem Thermometers especially for laboratory use, and a complete line of general purpose thermometers—cup-case and wall types, maximum and minimum thermometers, shipholds, hot-water, brine pipe, and shower bath thermometers. Send for catalog.

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TEMPERATURE, PRESSURE, FLOW *and* LEVEL INSTRUMENTS

Vacuum . . . Thermocouples

A COMPLETE LINE

embodying many unique features

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- DEPENDABLE STABILITY
- MORE EFFICIENT
- HIGHER OVERLOAD
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- SMALLER SIZE—1/2"x1"
- LOWER COST

These thermocouples will meet the most rigid specifications. Prompt delivery is assured. Write your requirements to:

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For addresses, see pages 5658

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Thermometers, Mercury, Industrial

with Red Reading Column. All industrial ranges, forms, sizes, bulbs, sockets, etc. ALL!

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10" chart, flush, wall, portable, etc. From one to four pens.

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4½", 6", 8", 10" and 12"

Recording and dial thermometers are all mercury-filled, available in over fifty ranges, with numerous styles of tubing, bulbs, connections, etc.

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Psychrometers, Recording

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Brown Inst. Co.
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Foxboro Co.
General Elec. Co.
Hoskins Mfg. Co.
Ill. Testing Labs.
Leeds & Northrup
Lewis Engg. Co.
Taglabue Mfg. Co.
Taylor Inst. Cos.
Thwing-Albert Instrument
Wheelco Inst. Co.

THERMOCOUPLES, Contact Type
Bailey Meter Co.
Bristol Co.
Cambridge Inst. Co.
General Controls Co.
Hickok Elec. Inst. Co.
Ill. Testing Labs.
Lewis Engg. Co.
Sensitive Research Inst.
Thwing-Albert Instrument
Wheelco Inst. Co.

THERMOCOUPLES, Base-metal (See Base Metal, above)

THERMOCOUPLES, Separate Heater type
General Radio Co.

THERMOCOUPLES, Vacuum
Am. Elec. Sales Co.
Cambridge Inst. Co.
General Elec. Co.
General Radio Co.
Hickok Elec. Inst. Co.
Rawson Elec. Inst. Co.
Sensitive Research Inst.

THERMO-HYDROMETERS (See Hydrometers, Thermo)

THERMOMETER TESTERS (See Testers, Thermometer)

THERMOMETERS, Indicating, Electrical Resistance
Am. Temperature Ind.
Bailey Meter Co.
Bristol Co.
Brown Inst. Co.
Engelhard, Chas.

THERMOMETERS, Indicating, Electrical Resistance (Cont'd)
Foxboro Co.
General Elec. Co.
G-M Labs.
Gow-Mac Instrument
Ill. Testing Labs.
Leeds & Northrup Co.
Rubicon Co.
Shallcross Mfg. Co.
Southwn Electronics Labs.
Taglabue Mfg. Co.
Thwing-Albert Instrument
Weston Elec. Inst. Corp.
Wheelco Inst. Co.

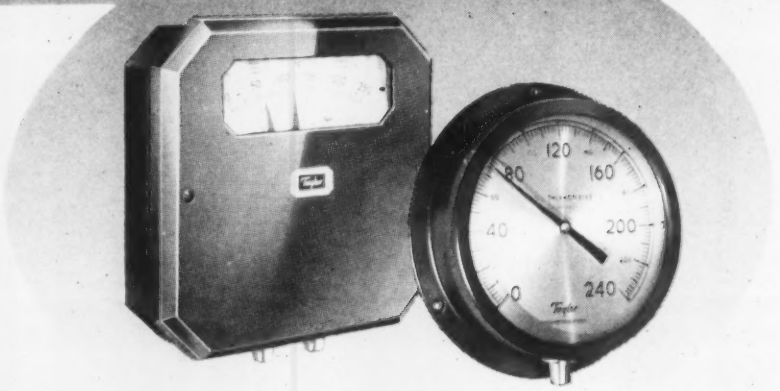
THERMOMETERS, Indicating, Mechanical
Bristol Co.
Consol. Ashcroft Hancock
Crew Equip. Co.
Foxboro Co.
Fuess, Inc.
G. M. Mfg. Co., Inc.
H-B Inst. Co., Inc.
Kollsman Inst. Co.
Partlow Corp.
Phila. Thermometer Co.
Rochester Mfg. Co.

THERMOMETERS, Indicating, Mechanical (Cont'd)
Scientific Inst. Co.
Southwn Electronics Labs.
Standard Thermometer
Taglabue Mfg. Co.
Taylor Inst. Cos.
Thrush & Co.
U. S. Gauge Co.
Wagner & Son
Western Machinery Co.
Weston Elec. Inst. Corp.

THERMOMETERS, Indicating, Mercury-in-Glass
Ace Glass, Inc.
Accuracy Scientific Inst.
Bristol Co.
Chaslyn Co.
Consol. Ashcroft Hancock
Eimer & Amend
Fairchild Inst. Corp.
Fox & Stonewall
Fish-Schurman Co.
Fleischhauer & Son
Fried & Liesig
Fuess, Inc.

Taylor offers Round or Octagonal DIAL THERMOMETERS

of proved accuracy and long life



Let us help you select the type best suited to your needs

Taylor Rectangular Case Dial Thermometers, made for quick, accurate temperature taking, have easy-reading scales with large black figures and graduations. Wedge-shaped pointer directs the eye instantly to the temperature indication. They're available in any of the three types of power units — mercury-actuated, vapor-actuated, gas-actuated. For measuring one or two temperatures.

Standard finish of these Taylor Instruments is dull instrument black. White finished cases are also available.

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Let the Taylor Representative help you select the type of Taylor Dial Thermometer best suited to the requirements of your plant. Get in touch with him or write Taylor Instrument Companies, Rochester, New York. Plant also in Toronto, Canada. Catalog on request.

Taylor

Indicating | Recording • Controlling

TEMPERATURE, PRESSURE, FLOW *and* **LEVEL INSTRUMENTS**

For addresses, see pages 54-58

THERMOMETERS, Indicating Mercury-in-glass (Cont'd)
M. Mfg. Co., Inc.
Henry J.
Instrument Co.
Corp.
-B Inst. Co., Inc.
Eppley, J. S. F.
Service Co.
Thermometer
Instrument Co.
Thermometer
Co.
Sons
Mfg. Co.
Thermometer
Thermo. & Inst.
& Bierold
Division
Corp.
Apps.
Inst. Co.
Corp.
Erick F.
Mfg. Co.
Inst. Cos.
Machinery Co.
Sales Co.

THERMOMETERS, Indicating, Pressure-spring
Bailey Meter Co.
Bristol Co.
Dickson Co.
Foxboro Co.
Industrial Instrument Co.
King Seeley Corp.
Liquidometer Co., Inc.
Marsh Corp., Jas. P.
Mason-Neilan Regulator
Moeller Instrument Co.
Partlow Corp.
Powers Regulator Co.
Practical Instrument Co.
Preferred Utilities Mfg.
Republic Flow Meters
Rochester, Mfg. Co.
Scientific Inst. Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Welch Mfg. Co.

THERMOMETERS, Portable
Bristol Co.
Brown Inst. Co.
Consol. Asbestos Hancock
Dickson Co.
Engelhard, Chas.
Foxboro Co.
Friez & Sons
Green, Henry J.
Mason-Neilan Regulator
Powers Regulator Co.
Practical Instrument Co.
Scientific Inst. Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Wagner & Son
Western Machinery Co.

THERMOMETERS, Recording and/or Controlling, Electrical Resistance
Bailey Meter Co.
Bristol Co.
Brown Inst. Co.
Cambridge Inst. Co.
Engelhard, Chas.
Foxboro Co.
General Elec. Co.
G-M Labs.
Ill. Testing Labs.
Leeds & Northrup Co.
Southern Electronics Labs.
Tagliabue Mfg. Co.
Thwing-Albert Instrument

THERMOMETERS, Recording and/or Controlling, Mechanical
Consol. Asbestos Hancock
Fire & Stemwedel
Foxboro Co.
Friez & Sons
Green, Henry J.
H-B Inst. Co., Inc.
Mason-Neilan Regulator
Moeller Instrument Co.
Partlow Corp.
Standard Thermometer

THERMOMETERS, Recording and/or Controlling, Pressure-spring
Bailey Meter Co.
Bristol Co.
Brown Inst. Co.
Consol. Asbestos Hancock
Defender Automatic Reg.
Dickson Co.
Foxboro Co.
Halpern, Walter J.
Industrial Inst. Co.
Liquidometer Co.
Mason-Neilan Regulator
Moeller Instrument Co.
Partlow Corp.
Powers Regulator Co.
Practical Instrument Co.
Preferred Utilities Mfg.
Republic Flow Meters
Scientific Inst. Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Wagner & Son

THERMOPILES
Buckley, G. S.
Cambridge Inst. Co.
Eppley Lab.
Gaertner Scientific Corp.
Hoffman Co., S. G.
Leeds & Northrup Co.
Rawson Electric Inst.

THERMOSTATS
Accuracy Scientific Inst.
Allen-Bradley Co.
American Inst. Co.
Automatic Products Co.
Brown Inst. Co.
Burling Inst. Co.
Controls, Inc.
Dickson Co.
Eastern Elec. Co.
Edison Elec. Controls
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Fisher Scientific Co.
Friez & Sons
Fulton Sylphon Co.
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General Elec. Co.
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H-B Inst. Co., Inc.
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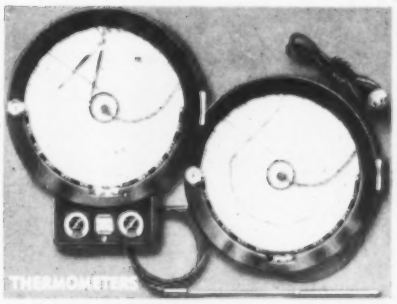
Precision Scientific Co.
Precision Therm. & Inst.
Ranco, Inc.
Rochester & Bierold
Robertshaw Thermostat
Scientific Glass Apps.
Spencer Thermostat Co.
Standard Therm., Inc.
Steele, Erick F.
Supreme Elec. Prods.
Tagliabue Mfg. Co.
Thrush & Co.
Trimet Co.
Wilkerson Co.



For Controlling, Recording and Indicating Temperatures from 40 to 1200 F.

A direct-acting, remote bulb type thermometer, consisting of instrument, bulb and connecting tubing completely assembled as one unit. Can be furnished with connecting tubing lengths up to 200 feet.

Charts and scales for a wide variety of ranges are available, from a minimum temperature span of 30 F to a maximum span of 1200 F. Corresponding Centigrade scales and charts are also available.

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AND
MINNEAPOLIS-HONEYWELL CONTROL SYSTEMS
To Measure and Control is to Economize

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THERMO-VOLTMETERS (See Voltmeters, Thermo)

THICKNESS GAGES (See Gages, Thickness)

THREAD MEASURING WIRES (See Wires, Thread Measuring)

THRUST METERS
Kingsbury Machine

TIDE GAGES
American Inst. Co.
Ballauf Mfg. Co.
Fuess, Inc.
Gurley, W. & L. E.

TIME, Controllers (See Controllers, Automatic, Time)

TIME, Indicators
Bristol Co.
Fuess, Inc.
Gaertner Scientific Corp.
Halpern, Walter J.
Jaeger Watch Co.
Paragon Electric Co.
Rawson Electrical Inst.
Southern Electronics Labs.
Stromberg Electric Co.
Tagliabue Mfg. Co.
Thompson Clock Co.
Warren Telechron Co.

TIME, Recorders
Am. Automatic Electric
Bristol Co.
Cramer & Co., Inc.

TIME, Recorders (Cont'd)
Electric Auto-Lite Co.
Friez & Sons
Fuess, Inc.
Gaertner Scientific Corp.
Halpern, Walter J.
Industrial Instrument Co.
Jaeger Watch Co.
Paragon Electric Co.
Scientific Inst. Co.
Service Recorder Co.
Southern Electronics Labs.
Stromberg Electric Co.
Tagliabue Mfg. Co.

TIME INTERVAL APPARATUS
Am. Gas Accumulator
American Timer Corp.
Coleman Elec. Co.

TIME INTERVAL APPARATUS (Cont'd)
Cramer & Co., Inc.
General Electric X-Ray
Guardian Elec. Mfg. Co.
Lapsed Time Inst.
Marsten Co.
Paragon Electric Co.
Perfex Corp.
Southern Electronics Labs.
Standard Elec. Time Co.
Stromberg Electric Co.
Thompson Clock Co.
United Circuitome Corp.
Walker Automatic Timer
Warren Telechron Co.
Westinghouse Elec. & Mfg.
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TIME METERS (See meters, time)

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BUT WHY HESITATE TO BUY A THERMOMETER WITH A RED COLUMN, WHICH COSTS NO MORE

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2511 NORWOOD AVE., CINCINNATI, NORWOOD, OHIO
Canadian Plant: King & Goulce Sts., Toronto

For addresses, see pages 54-58

TIME OPERATION, Indicators
Bristol Co.
Brown Inst. Co.
Elec. Tachometer Corp.
Gaertner Scientific Corp.
General Elec. Co.
Intern'l Business Mach.
Paragon Electric Co.
Southw'n Electronics Lab.
Stromberg Electric Co.
Tagliabue Mfg. Co.
Warren Telechron Co.
Weston Elec. Inst. Corp.

TIME OPERATION, Recorders
Am. Automatic Electric
Automatic Time Stamp
Bristol Co.
Brown Inst. Co.
Cardiagraph Co.
Cincinnati Time Rec.
Consol. Ascroft Hancock
Cramer & Co., Inc.
Elec. Tachometer Corp.
Ford Instr. Co.
Gaertner Scientific Corp.
Halbern, Walter J.
Industrial Instrument Co.
Jaeger Watch Co.
Intern'l Business Mach.
Marston Co.
Paragon Electric Co.
Practical Instrument Co.
Production Inst. Co.
Servo Recorder Co.
Southw'n Electronics Lab.
Tagliabue Mfg. Co.

TIME STAMPS
Automatic Time Stamp
Cincinnati Time Rec.
Intern'l Business Mach.
Stromberg Electric Co.

TIME SWITCHES (See Switches, Time)

TIMERS, AUTOMATIC, Automatic Reset
Am. Gas Accumulator
Automatic Elec. Mfg.
Automatic Temp. Control
Bristol Co.
Cramer & Co., Inc.
Eagle Signal Corp.
Guardian Elec. Mfg. Co.
Intercontinental Mark'ng
Mason-Neilan Regulator
Paragon Electric Co.
Production Inst. Co.
Southw'n Electronics Lab.
Stromberg Electric Co.
Struthers-Dunn

TIMERS, AUTOMATIC, Automatic Reset (Cont'd)
Taylor Inst. Cos.
Warren Telechron Co.
Zenith Electric Co.

TIMERS, AUTOMATIC, Cycle
Am. Gas Accumulator
Autocall Co.
Automatic Temp. Control
Bristol Co.
Brown Inst. Co.
Consol. Ashcroft Hancock
Cramer & Co., Inc.
Eagle Signal Corp.
Elec. Switch Corp.
Hanlin Waters, Inc.
Industrial Ind. Co.
Luxtrol Co., Inc.
Paragon Electric Co.
Penn Electric Switch
Sangamo Electric Co.
Southw'n Electronics Lab.
Stromberg Electric Co.
Taylor Inst. Cos.
Thomas Clock Co.
Thompson Clock Co.
Wales Automatic Timer
Warren Telechron Co.
West. Electro-Mechanical
Weston Elec. Inst. Corp.
Wheelco Inst. Co.
Zenith Electric Co.

TIMERS, AUTOMATIC, Interval
Am. Gas Accumulator
Am. Timer Corp.
Anderson, A. & J. M.
Automatic Elec. Mfg.
Automatic Temp. Control
Bristol Co.
Cramer & Co., Inc.
Eagle Signal Corp.
Elec. Switch Corp.
Frober-Faybor Co.
General Electric X Ray
Glogau & Co.
Guardian Elec. Mfg.
Industrial Engr. Corp.
Laurs, J. Milton
Measured Time, Inc.
Paragon Electric Co.
Perfex Corp.
Production Inst. Co.
Standard Elec. Time
Stromberg Electric Co.
Struthers Dunn
Tagliabue Mfg. Co.
Thomas Clock Co.
Thompson Clock Co.
Walser Automatic Timer
Warren Telechron Co.
Zenith Electric Co.

TIMERS, AUTOMATIC, Process
Am. Gas Accumulator
Autocall Co.
Automatic Elec. Mfg.
Automatic Temp. Control
Bristol Co.
Consol. Ashcroft Hancock
Cramer & Co., Inc.
Denver Fire Clay
Eagle Signal Corp.
Electric Controller
Elec. Switch Corp.
Gaertner Scientific Corp.
Industrial Engr. Corp.
Industrial Inst. Co.
Luxtrol Co., Inc.
Magnetic Gauge Co.
Paragon Electric Co.
Powers Regulator Co.
Southw'n Electronics Labs.
Stromberg Electric Co.
Struthers-Dunn
Tagliabue Mfg. Co.
Taylor Inst. Cos.
United Cinephone Corp.
Warren Telechron Co.
West. Electro-Mechanical
Weston Elec. Inst. Corp.
Zenith Electric Co.

TIMERS, AUTOMATIC, Spot Weld
Allen-Bradley Co.
Am. Gas Accumulator
Cramer & Co., Inc.
Cutler-Hammer, Inc.
Electric Controller
General Elec. Co.
United Cinephone Corp.

TOOLMAKER'S FLATS
Ecker, J. W.
Pratt & Whitney
Van Keuren Co.

TOPOGRAPHIC INSTRUMENTS (See Surveying Instruments)

TORQUE GAGES (See Gages, Torque)

TORSIOGRAPH
Baldwin-Southwark Corp.
Commercial Engr. Labs.

TORSION METERS
Boulin Inst. Corp.
Cummings Mach. Works
Holz, Herman A.
Kurman Electric Co.
Riehle Div.
Saxl Inst. Co.
Toledo Scale Co.

TOTALIZERS, Demand
American Meter Co.
General Elec. Co.
United Cinephone Corp.
Westinghouse Elec. & Mfg.

TOTALIZERS, Electric Energy
Autocall Co.
Esterline Angus Co.
General Elec. Co.
Westinghouse Elec. & Mfg.

TOTALIZERS, Fluid Flow
Bailey Meter Co.
Brown Inst. Co.
Builders-Iron Foundry
Henszey Co.
Mason-Neilan Regulator
Republic Flow Meters
Tagliabue Mfg. Co.
Taylor Inst. Cos.

TOTALIZERS, Gas Flow
American Meter Co.

TOTALIZERS, Running Time
Cramer & Co., Inc.
Elec. Tachometer Corp.
Photoswitch, Inc.
Production Equipment
Southw'n Electronics Labs.
United Cinephone Corp.
Westinghouse Elec. & Mfg.

TRAFFIC SIGNALING DEVICES (See Signaling Devices, Traffic)

TRAMMELS, Steel Beam
Union Tool Co.

TRANSFORMERS, Adjustable
General Radio Co.

TRANSFORMERS, Experimenter's Variable Voltage
Dongan Electric Mfg.

TRANSFORMERS, Instrument
Allis Chalmers Mfg.
Amnis Co.
Columbia Elec. Mfg.
Dongan Electric Mfg.
Elec. Facilities, Inc.
Esterline Angus Co.
Friez & Sons
General Elec. Co.
Hickok Elec. Inst. Co.
Industrial Engr. Corp.
Lipman Engr. Co.
Mahr Co., Bertrand F.
Roller-Smith Co.
Sangamo Electric Co.
Thordarson Elec. Co.
Unitrol Transformer Corp.
West. Electro-Mechanical
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

TRANSFORMERS, Insulation Testing
Dongan Electric Mfg.

TRANSFORMERS, Laboratory
American Transformer
Central Scientific Co.
Chonin-Brenale Co.
Dayen Co.
Dongan Electric Mfg.
Eastern Specialty Co.
Elec. Facilities, Inc.
General Elec. Co.
General Radio Co.
Halldorson Co.
Standard Elec. Prods.
Miller Co., Bertrand F.
Raytheon Mfg. Co.
Thordarson Elec. Co.
United Transformer Corp.
Westinghouse Elec. & Mfg.
Weston Elec. Inst. Corp.

TRANSFORMERS, Phasing
Dongan Electric Mfg.
Eastern Specialty Co.
Seaver Co.
Thordarson Mfg. Co.
United Transformer Corp.
Westinghouse Elec. & Mfg.

TRANSFORMERS, Power
Ferranti Electric

TRANSFORMERS, Split Core
Elec. Facilities, Inc.
General Elec. Co.
H D Elec. Co.
Industrial Eng. Corp.
Roller-Smith Co.
Rubicon Co.
Sangamo Electric Co.
Thordarson Elec. Co.
United Transformer Corp.
Western Electro-Mech.
Westinghouse Elec. & Mfg.

TRANSFORMERS, Variable Voltage Testing
American Transformer
Dongan Electric Mfg.

TRANSITS, Astronomical
American Askania Corp.

TRANSITS, Engineer's (See Surveying Instruments)

TRANSITS, Pocket
Ainsworth & Sons
Keuffel & Esser Co.
Miro Instrument Co.
Speidel & Co.
Warren Knight Co.
White Co., Inc.

TRUCK MILEAGE RECORDERS (See Meters, Mileage)

TRUCK-TIME RECORDERS
Cramer & Co., Inc.
Durant Mfg. Co.
Ohmer Register Co.
Service Recorder Co.

TRUCK, TIME & MILEAGE RECORDERS
Cramer & Co., Inc.
Ohmer Register Co.
Sangamo Electric Co.

TUBES (See also Gas & Vapor Discharge Tubes)

TUBES, Cathode Ray (See Cathode Ray Tubes)

TUBES, Nessler (See Nessler Tubes)

TUBES, Oil Centrifuge (See Oil Centrifuge Tubes)

TUBES, Pitot (See Flowmeters, Pitot Tube)

TUBES, Polariscope
Akatos, Inc.
American Inst. Co.
Bausch & Lomb Optical
Central Scientific Co.
Eimer & Amend
Ficker, J. W.
Gaertner Scientific Corp.
Hellige, Inc.
Precision Scientific Co.
Sargent & Co.

TUBES, Precision Bore (See Precision Bore Glass Tubing)

TUBES, Spectrum (See Spectrum Tubes)

TUBES, Ultra-Violet Light (See Ultra-Violet Light Sources)

TUBES, Vacuum
Arcturus Radio Tube Co.
Central Scientific Co.
General Elec. Co.
General Scientific Corp.
General Television Corp.
Raytheon Mfg. Co.
RCA Manufacturing Co.
Wheelco Inst. Co.

TUBES, Venturi (See Flowmeters, Venturi)

TUBES, X-Ray
American Inst. Co.
Baird Associates
Corning Glass Works
General Electric X Ray
Kelley Koett Mfg.
Westinghouse X Ray Co.

TUNING FORKS, Electrically Driven (See Forks, Tuning)

TURBIDIMETER
Akatos, Inc.
American Inst. Co.
Cargille, R. P.
Central Scientific Co.
Eimer & Amend
Ess Instrument Co.
Fisher Scientific Co.
Hellige, Inc.
Kimble Glass Co.
Klett Mfg. Co.
Luxtrol Co., Inc.
Parr Instrument Co.
Pfaltz & Bauer, Inc.
Photoswitch, Inc.
Precision Scientific Co.
Rawson Electrical Inst.
Rubicon Co.
Sensitive Research Inst.
Southw'n Electronics Lab.
Zeiss, Inc., Carl

TURN & BANK INDICATORS
Kollsman Inst. Co.

TURN INDICATOR TESTERS (See Testers, Turn Indicator)

TWIST COUNTERS (See Counters, Twist)

ULTRA-VIOLET INDICATORS & RECORDERS
Hanovia Chem. & Mfg.

U-TUBE MANOMETERS (See Manometers)

ULTRA-VIOLET LIGHT SOURCES (See Light Sources)

VACUUM, Indicators
Allen Elec. & Equip.
American Meter Co.
Ashton Valve Co.
Bailey Meter Co.
Baird Associates
Bristol Co.
Brown Inst. Co.
Central Scientific Co.
Consol. Ashcroft Hancock
Eimer & Amend
Foxboro Co.
General Elec. Co.
Kollsman Inst. Co.
Mason-Neilan Regulator
Mueller Instrument Co.
Potter Co.
Precision Therm. & Inst.
Rawson Electrical Inst.
Republic Flow Meters
Rochester Mfg. Co.
Scientific Glass Apparatus
Star Brass Mfg. Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Tebbins Instrument Co.

VACUUM, Recorders
American Meter Co.
Ashton Valve Co.
Bailey Meter Co.
Bristol Co.
Brown Inst. Co.
Consol. Ashcroft Hancock
Dickson Co.
Esterline Angus Co.
Foxboro Co.
Mason-Neilan Regulator
Republic Flow Meters
Scientific Instrument Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Tebbins Instrument Co.

VACUUM GAGES, Hot-Wire
Continental Elec. Co.
Fuess, Inc.
General Elec. Co.

VACUUM GAGES, Ionization
General Elec. Co.
General Television Corp.

VACUUM GAGES, Liquid-column
American Meter Co.
Barigarach Industrial Inst.
Defender Automatic Reg.
Dubrovin, John
Gas Appliance Specialties
Lantz Phelps Corp.
Meriam Co.
Precision Therm. & Inst.
Scientific Glass Apparatus
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Tebbins Instrument Co.

VACUUM GAGES, McLeod
Arc Glass, Inc.
Central Scientific Co.
Eimer & Amend
General Elec. Co.
General Physical Lab.
Macalaster Bicknell Co.
Scientific Glass Apparatus
Welch Mfg. Co.

VACUUM GAGE, Pirani Type
Distillation Products

VACUUM, HIGH (below 1 mu) Controllers
Area Regulators, Inc.
Bristol Co.
Defender Automatic Reg.
Electronic Prod. Co.
Foxboro Co.
Hoke, Inc.
Tagliabue Mfg. Co.

VACUUM, HIGH (Below 1 mu) Indicators
Baird Associates
Bristol Co.
Continental Elec. Co.
Defender Automatic Reg.
Eimer & Amend
Foxboro Co.
General Elec. Co.
General Physical Lab.
Tagliabue Mfg. Co.
Welch Mfg. Co.

VACUUM, HIGH (Below 1 mu) Recorders
Bristol Co.
Defender Automatic Reg.
Foxboro Co.
Tagliabue Mfg. Co.

VACUUM SPECTROGRAPHS (See Spectrographs, Vacuum)

VACUUM TUBES (See Tubes, Vacuum)

VACUUM TUBE BRIDGES (See Bridges, Vacuum Tube)

VACUUM TUBE RELAYS (See Relays, Vacuum Tube)

KWIXSET Time Controls are furnished for automatically timing operations varying from 10 seconds to 12 hours by operating switches and relays for necessary load.

Thompson Electric STOP TIMERS supersede stop watches for accurate timing. The 3" dial makes reading to 1/5th second very easy. Rugged instrument suitable for laboratory use or production operations.

Kwixset Time Control

Thompson Electric Stop Timer

THE H. C. THOMPSON CLOCK COMPANY
BRISTOL, CONN.

For addresses, see pages 54-58

VACUUM TUBE VOLTMETERS (See Voltmeters, Vacuum Tube)

VALVE BOX FINDER (See Finder, Valve Box)

VALVE-OPERATING DEVICES, Electric Motor
Baldwin Southwark Corp.
Barber-Coleman Co.
Beck Co.
Brown Inst. Co.
Cramer & Co., Inc.
Cutler-Hammer, Inc.
Dickson Co.
Foxboro Co.
General Controls Co.
Hays Corp.
Illinois Eng. Co.
Jenkins Bros.
McAlear Mfg. Co.
R-S Products Corp.
Ruggles-Klingemann
Tagliabue Mfg. Co.

VALVE OPERATING DEVICES, Electric Solenoid
Automatic Products Co.
Automatic Switch Co.
Barber-Coleman Co.
Brown Inst. Co.
Cutler-Hammer, Inc.
Electric Valve Mfg.
Electrimatic Corp.
Frick Co.
General Controls Co.
General Elec. Co.
Guardian Elec. Mfg. Co.
Hagan Corp.
Hannifin Mfg. Co.
Hays Corp.
Leslie Co.
McDonnell & Miller
Penn Electric Switch Co.
Perfex Corp.
Refrigerating Spec. Co.
R-S Products Corp.
Ruggles-Klingemann
Supreme Elec. Prods.
Spence Engineering Co.
Tagliabue Mfg. Co.

VALVE OPERATING DEVICES, Hydraulic
Area Regulators, Inc.
Askania Regulator Co.
Atlas Valve Co.
Automatic Temp. Control
Bailey Meter Co.
Cash Co.
Controls, Inc.
General Controls Co.
General Elec. Co.
Hagan Corp.
Hanlon-Waters, Inc.
Hannifin Mfg. Co.
Hays Corp.
Hunt & Son
International Filter Co.
Jenkins Bros.
Mason-Neilan Regulator
McAlear Mfg. Co.
Republic Flow Meters
Robertshaw Thermostat
R-S Products Corp.
Ruggles-Klingemann
Schade Valve Mfg.
Spence Engineering Co.

VALVE-OPERATING DEVICES, Pneumatic
Askania Regulator Co.
Atlas Valve Co.
Brown Inst. Co.
Cash Co.
Consol. Ashcroft Hancock
Foxboro Co.
Hagan Corp.
Hanlon-Waters, Inc.
Hannifin Mfg. Co.
Hunt & Son
Illinois Eng. Co.
Industrial Instrument Co.
Mason-Neilan Regulator
McAlear Mfg. Co.
Powers Regulator Co.
Republic Flow Meters
R-S Products Corp.
Ruggles-Klingemann
Tagliabue Mfg. Co.
Taylor Inst. Cos.

VALVE POSITION INDICATORS
Autorail Co.
Automatic Temp. Control
Bailey Meter Co.
Beck Co.
Bendix Marine Products
Builders Iron Foundry
Consol. Ashcroft Hancock
Elec. Indicator Corp.
Elec. Tachometer Corp.
General Regulator Corp.
Hanlon-Waters, Inc.
Northern Equip. Co.
Southwn Electronics Labs.
Taylor Inst. Cos.
Tefft-Jackson, Inc.

VALVES, Ammonia & Sulphur Dioxide
Frick Co.
Judson Governor Co.
Cash Co.
Crosby Steam Gage Co.
D'Este Co.
General Controls Co.
Hoke, Inc.

VALVES, Ammonia & Sulphur Dioxide (Cont'd)
Jenkins Bros.
Klingertit, Inc.
Perfex Corp.
Refrigerating Spec. Co.
R-S Products Corp.
Spence Engineering Co.
Taylor Inst. Cos.
Vogt Machine Co.

VALVES, Automatic Shut-off
Automatic Switch Co.
Automatic Valve Control
Belfield Co.
Brown Inst. Co.
Davis Reg. Co.
Eclipse Fuel Engg. Co.
Fisher Governor Co.
Foster Engg. Co.
Frick Co.
Friez & Sons
General Controls Co.
General Sales & Prod.
Hagan Corp.
Hanlon Waters, Inc.
Jerguson Gage Co.
Kiely & Mueller
McDonnell & Miller
Partlow Corp.
Ruggles-Klingemann
Payne Furnace & Supply
R-S Products Corp.
Schade Valve Mfg. Co.
Tagliabue Mfg. Co.
Wilgus Mfg. Co.

VALVES, Automatic Solenoid
Atkins & Co.
Atlas Valve Co.
Automatic Switch Co.
Brown Inst. Co.
Davis Reg. Co.
Detroit Lubricator Co.
Electric Valve Mfg. Co.
Electrimatic Corp.
Friez & Sons
General Controls Co.
General Sales & Prod.
Hagan Corp.
Leslie Co.
McDonnell & Miller
Northern Equip. Co.
Partlow Corp.
Penn Electric Switch Co.
Perfex Corp.
Refrigerating Spec. Co.
R-S Products Corp.
Ruggles-Klingemann
Schade Valve Mfg. Co.
Spence Engineering Co.
Supreme Elec. Prods.
Tagliabue Mfg. Co.

VALVES, Back Pressure
Area Regulators, Inc.
American Meter Co.
Atlas Valve Co.
Bailey Meter Co.
Bastian-Blessing Co.
Belfield Co.
Boylston Co.
Cash Co.
Cochrane Corp.
Connelly Iron Sponge
Crosby Steam Gage Co.
Davis Reg. Co.
Electrimatic Corp.
Fisher Governor Co.
Foster Engg. Co.
Gas Appliance Spec.
Hagan Corp.
Hanlon-Waters, Inc.
Illinois Eng. Co.
Jenkins Bros.
Kenyon Instrument Co.
Kiely & Mueller
Klipfel Mfg. Co.
McAlear Mfg. Co.
Nathan Mfg. Co.
Linde Air Products Co.
Mason-Neilan Regulator
Natural Gas Equipment
Refrigerating Spec. Co.
Reynolds Gas Regulator
Ruggles-Klingemann
Spence Engineering Co.
Stickle Steam Specialties
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Wilgus Manufacturing

VALVES, Balanced
American Meter Co.
Atlas Valve Co.
Bailey Meter Co.
Belfield Co.
Boylston Co.
Bristol Co.
Cash Co.
Cochrane Corp.
Connelly Iron Sponge
Davis Reg. Co.
Defender Automatic Reg.
D'Este Co.
Fisher Governor Co.
Ford Reg. Valve Co.
Foster Engg. Co.
General Controls Co.
Hagan Corp.
Hanlon-Waters, Inc.
Illinois Eng. Co.
Industrial Instrument
Jenkins Bros.
Kiely & Mueller
Klipfel Mfg. Co.
Mason-Neilan Regulator
McAlear Mfg. Co.
Natural Gas Equipment
Northern Equip. Co.
Powers Regulator Co.

VALVES, Balanced (Cont'd)
Republic Flow Meters
Reynolds Gas Regulator
Ruggles-Klingemann
Schade Valve Mfg. Co.
Spence Engineering Co.
Tagliabue Mfg. Co.
Tribby Mfg. Co.
Watts Regulator Co.
Wilgus Manufacturing

VALVES, Blow-off
Cochrane Corp.
Connelly Iron Sponge
Consol. Ashcroft Hancock
Cramer & Co., Inc.
Eclipse Fuel Engg. Co.
Frick Co.
Jenkins Bros.
Judson Governor Co.
Nathan Mfg. Co.
Natural Gas Equipment
Ohio Injector Co.
Reynolds Gas Regulator
Tagliabue Mfg. Co.
Victor Equipment Co.
Wilgus Manufacturing
Yarnell Warring Co.

VALVES, Check Valves
Abercrombie Pump Co.
Bastian-Blessing Co.
Belfield Co.
Cochrane Corp.
Connelly Iron Sponge
Consol. Ashcroft Hancock
Cramer & Co., Inc.
Davis Reg. Co.
Foster Engg. Co.
Frick Co.
Gas Appliance Specialties
Industrial Instrument
Jenkins Bros.
Kenyon Instrument Co.
Nathan Mfg. Co.
Ohio Injector Co.
Preferred Utilities Mfg.
Reynolds Gas Regulator
Ruggles-Klingemann
Star Brass Mfg.
Trill Indicator Co.
Tribby Mfg. Co.
Vapor Recovery Systems
Williams Gauge Co.

VALVES, Chlorine
Area Regulators, Inc.
Everson Mfg. Co.
H ke, Inc.
Jenkins Bros.
Ohio Injector Co.

VALVES, Compressed Gas
American Meter Co.
Bastian-Blessing Co.
Cash Co.
Connelly Iron Sponge
Fisher Governor Co.
Foster Engg. Co.
H ke, Inc.
Linde Air Products Co.
Jenkins Bros.
Mason-Neilan Regulator
Part Instrument Co.
Tagliabue Mfg. Co.

VALVES, Constant Pressure
Bailey Meter Co.
Belfield Co.
Cash Co.
Connelly Iron Sponge
Davis Reg. Co.
D'Este Co.
Dickson Co.
Fisher Governor Co.
Foster Engg. Co.
Hagan Corp.
Hanlon-Waters, Inc.
Hoke, Inc.
Jenkins Bros.
Klipfel Mfg. Co.
Mason-Neilan Regulator
Powers Regulator Co.
Refrigerating Spec. Co.
Reynolds Gas Regulator
Ruggles-Klingemann
Schade Valve Mfg. Co.
Spence Engineering Co.
Tagliabue Mfg. Co.
Vaughn-G. E. Witt Co.
Wilgus Manufacturing

VALVES, Diaphragm
Atlas Valve Co.
Bailey Meter Co.
Bastian-Blessing Co.
Belfield Co.
Boylston Co.
Bristol Co.
Brown Inst. Co.
Cash Co.
Connelly Iron Sponge
Consol. Ashcroft Hancock
Davis Reg. Co.
Defender Automatic Reg.
D'Este Co.
Foster Engg. Co.
General Controls Co.
Hagan Corp.
Hanlon-Waters, Inc.
Illinois Eng. Co.
Industrial Instrument
Johnson Service Co.
Kiely & Mueller
Klipfel Mfg. Co.
Leslie Co.
Mason-Neilan Regulator
McAlear Mfg. Co.
McCorkle Co.
National Airoil Burner
Natural Gas Equipment
Partlow Corp.
Payne Furnace & Supply

VALVES, Diaphragm (Cont'd)
Powers Regulator Co.
Refrigerating Spec. Co.
Reynolds Gas Regulator
Ruggles-Klingemann
Schade Valve Mfg. Co.
Scientific Instrument Co.
Spence Engineering Co.
Spencer Thermostat Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Vaughn G. E. Witt
Wage Rodgers Electric
Wilgus Manufacturing

VALVES, Differential
Atlas Valve Co.
Bailey Meter Co.
Belfield Co.
Boylston Co.
Brown Inst. Co.
Cash Co.
Connelly Iron Sponge
Davis Reg. Co.
D'Este Co.
Fisher Governor Co.
Foster Engg. Co.
Hagan Corp.
Hanlon-Waters, Inc.
Illinois Eng. Co.
Kiely & Mueller
Klipfel Mfg. Co.
Mason-Neilan Regulator
McAlear Mfg. Co.
Natural Gas Equipment
Northern Equip. Co.
Reynolds Gas Regulator
R-S Products Corp.
Ruggles-Klingemann
Schade Valve Mfg. Co.
Spence Engineering Co.
Tagliabue Mfg. Co.
Wilgus Manufacturing

VALVES, Electrically Operated
Atkins & Co.
Automatic Products Co.
Automatic Switch Co.
Automatic Temp. Control
Atlas Valve Co.
Bristol Co.
Brown Inst. Co.
Cochrane Corp.
Cutler-Hammer, Inc.
Davis Reg. Co.
Defender Automatic Reg.
Detroit Lubricator Co.
Electric Valve Mfg.
Electrimatic Corp.
Foster Engg. Co.
Frick Co.
Friez & Sons
General Controls Co.
Hannifin Mfg. Co.
Hunt & Son
Illinois Eng. Co.
Jenkins Bros.
Kiely & Mueller
Klipfel Mfg. Co.
Leslie Co.
Mechanical Valve Corp.
Mason-Neilan Regulator
McAlear Mfg. Co.
McCorkle Co.
McDonnell & Miller
Northern Equipment Co.
Payne Furnace & Supply
Penn Electric Switch
Perfex Corp.
Refrigerating Spec. Co.
Ross Operating Valve
Ruggles-Klingemann
Schade Valve Mfg. Co.
Shalleross Mfg. Co.
Spence Engineering Co.
Supreme Elec. Prods.
Tagliabue Mfg. Co.
White Rodgers Elec. Co.

VALVES, High Pressure
American Inst. Co.
Area Regulators, Inc.
Atlas Valve Co.
Bailey Meter Co.
Bastian-Blessing Co.
Belfield Co.
Boylston Co.
Cash Co.
Cochrane Corp.
Connelly Iron Sponge
Consol. Ashcroft Hancock
Crosby Steam Gage
Davis Reg. Co.
D'Este Co.
Fisher Governor Co.
Foster Engg. Co.
Hagan Corp.
Hanlon-Waters, Inc.
Hoke, Inc.
Hunt & Son
Industrial Instrument Co.
Jenkins Bros.
Kiely & Mueller
Klipfel Mfg. Co.
Linde Air Products Co.
Mason-Neilan Regulator
Merco Nordstrom Valve
Nathan Mfg. Co.
Natural Gas Equipment
Republic Flow Meters
Ruggles-Klingemann
Spence Engineering Co.
Tagliabue Mfg. Co.
Taylor Inst. Cos.
Vogt Machine Co.
Wilgus Manufacturing

VALVES, Indicating Steam Control
Brown Inst. Co.
Cash Co.
Hagan Corp.

(Continued on next page)

For addresses, see pages 54-58

Foxboro Valves for air-operated controllers should be specified with Foxboro Controllers — because the characteristic of the Valve should fit the characteristic of the Instrument. The Valve is a vital part of a Control installation. The Foxboro line is engineered to assure the best results.

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Shallcross Mfg. Co.
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Weston Elec. Inst. Corp.

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Hickok Elec. Inst. Co.
Rawson Electrical Inst.
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Supreme Instruments
Triplett Electrical Inst.
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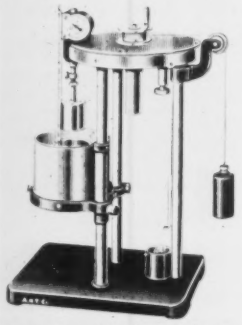

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Voland & Sons, Inc.

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Howe Scale Co.
Newark Scale Works
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Howe Scale Co.
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Seederer-Kohlbusch, Inc.
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X-RAY SPECTROMETERS (See Spectrometers, X-Ray)

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I

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J

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American Meter Company 14
American Transformer Company 37
Ames Company, B. C. 18
Amthor Testing Instrument Co., Inc. 46
Atlas Electric Devices Company 46
Bacharach Industrial Instrument Co. 25
Bailey Meter Co. 7, 11, 12, 13, 16, 19
Bin-Dicator Company 10
Boulin Instrument Corporation 42
Bristol Co., The Back Cover
Brown Instrument Company 10, 16, 21, 32, 35, 49
Brush Development Company 21
Buffalo Meter Company 25
Burling Instrument Company 12
Burlington Instrument Corporation 37
Chatillon & Sons, John 42
Chelsea Clock Company 9
Clifford Manufacturing Company 6
Cochrane Corporation 16
Commercial Engineering Laboratories 24
Continental Electric Company 8, 19
Cornell Dubilier Electric Corporation Inside Back Cover
Dietert Co., Harry W. 27
Dumont Labs., Inc., Allen B. 28
Eimer & Amend 44
Electric Heat Control Apparatus Co. 28
Electric Tachometer Corporation 41
Electrical Research Products, Inc. 2
Engelhard, Inc., Charles 22
Eppley Laboratory, Inc. 8
Everson Manufacturing Co. 10
Falstrom Company 32
Federal Products Corporation 18, 19
Ferner Co., R. Y. 45
Ferris Instrument Corporation 5
Fisher Governor Company 53
Foxboro Company, The 11, 17, 18, 23, 26, 34, 35, 38, 49, 51
Geophysical Instrument Company 22
Glass Engraving Company 41
G-M Laboratories, Inc. 20
Gordon Company, Claud S. 34
Gow-Mac Instrument Company 22
Guardian Electric Company 39
Hays Corporation, The 9, 17, 21
Hickok Electrical Instrument Co., The 2
Hoke, Incorporated 51
Impact Register Company 40
Keller Manufacturing Co., G. P. 6
Kewaunee Manufacturing Company 17
Kollsman Instrument Company, Inc. 2
L. A. B. Corporation 26
Landis & Gyr, Inc. 6
Leeds & Northrup Company 7, 13, 23, 32, 35, 43
Lewis Engineering Company, The 33
Liquidometer Company, Inc. 19
Loewenberg, Dr. F. 8
Lord Manufacturing Company 29
Macbeth Daylighting Company, Inc. 3
Mason-Neilan Regulator Company 10
McFarlin Company 24
Micro Switch Corporation 43
Moeller Instrument Company 48
Morey & Jones, Ltd. 16
National Meter Company 25
National Technical Laboratories 23
New Jersey Meter Company 17
Ohmite Manufacturing Company 38
Palmer Company, The 49
Perkins & Son, Inc. 45
Petrometer Corporation 18
Pittsburgh Equitable Meter Company 26
Pittsburgh Instrument & Machine Co. 44
Precision Resistor Company 39
Pyro-Electro Instrument Company 44
Pyrometer Instrument Company 34
Rawson Electrical Instrument Co. 25
Raytheon Manufacturing Company 36
Refinery Supply Company 23
Roller-Smith Company 57
Shallcross Manufacturing Company 7
Sodemann Heat & Power Company 44
Spencer Lens Company 27
Standard Electric Time Company 9
Sticht & Company, Herman H. 43
Tagliabue Manufacturing Co., C. J. Inside Front Cover
Taylor Instrument Companies 11, 15, 37, 47, 48
Thomas Company, Arthur H. 52
Thompson Clock Company, H. C. 50
Thwing-Albert Instrument Co. 30-31
Torsion Balance Company 4
Voland & Sons, Inc. 4
Ward Leonard Electric Company 38
Wheelco Instruments Company 12, 13, 33
Wilder, Inc., R. S. 27

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Autographic Indicators for Internal Combustion Engines. By J. Okill. Edward Arnold & Co., London, 1938; Longmans Green & Co., New York, 1938. Cloth, 5 × 7½ inches, 88 pages. Price 4/6.

Professors of engineering, and generally, persons who spend their lives in or around engineering laboratories are likely to be infected sooner or later with the "Bacillus Indicatoris." The malady manifests itself in preoccupation with the history, construction, use, virtues and shortcomings of the indicator, and in an urge and restlessness to do something about it. The reviewer is also afflicted and therefore knows the symptoms. Once contracted the affliction usually lasts for life, with no known cure for it, though a temporary relief is obtained if the patient makes an invention, or writes a book or article, relating to the indicator.

The author of this book—a lecturer in engineering and superintendent of the mechanical engineering laboratories at the University of Liverpool—did both. In 1907 he invented the Okill maximum pressure indicator, a well-known instrument for determining the compression and combustion pressure in internal combustion engines, especially of the high-speed type. Now, more than thirty years later (notice the stubbornness of the malady!) he produces the book under review, which despite its small size contains a surprising amount of interesting and new information in this much-cultivated field. This book is not intended to be a complete, from the ground up, treatise on the indicator. It presupposes a familiarity of the reader with the construction and use of the instrument. Furthermore, the treatment is restricted to the normal, piston-type and pencil-recording instruments, omitting intentionally the micro-, optical and electrical types. It is rather a sound and interesting commentary on the construction and best use of the indicator, based on the long study and original investigations of the author. The first chapter deals with the early history of the indicator, the work of Watt, Southern, McNaught and some other early pioneers in those twilight years of engineering awakening in the early 19th century. Subsequent chapters treat piston friction and leakage; errors due to inertia and to faulty drum drive; testing of indicators statically and also at their working speed; development of the Okill maximum pressure indicator from its inception to its latest refined form; determination of compression ratio; indicated and brake mean-effective pressure; indicator valves; out-of-phase diagrams, valve-lift diagrams, timing of injection and ignition in oil engines; description and illustration of the most used types of indicators.

The only criticism the reviewer can advance is that this book is too short; the reader feels that the author could tell more, if he had the time and space for it. Some of the illustrations are blurred. On the whole, however, the book is well worth reading and is a useful addition to the literature on indicators.

—K. J. DeJuhasz, *Asso. Prof. Engineering Research, Pennsylvania State College.* (2.09)-B-

Der Indikator. By K. J. DeJuhasz and J. Geiger. Verlag Julius Springer, Berlin, 1938. Paper, 6⅛ × 9⅜ inches; IX + 293 pages. Price 27 RM (bound, 28.80 RM).

With the exception of the book by DeJuhasz published by *Instruments* in 1933, no complete treatise on indicators has appeared for many years—years during which many fundamental developments have been made—and the work under review is therefore both timely and welcome. It represents an interesting international collaboration of Professor DeJuhasz (Pennsylvania State College) and Dr.-Ing. Geiger (Augsburg).

A brief historical sketch of the development of the mechanical type of indicator opens the work. The authors point out that with increases in speed and pressures, the problem of design has changed from a purely kinematic to a dynamic one. The importance of high natural frequency is stressed and the limitations of the mechanical type are defined. A later section of the work is devoted to the dynamical questions involved. The authors state the conclusions that no further radical developments, except refinements of design and perfected workmanship, are to be looked for in mechanical indicators.

Following the section on mechanical indicators, optical and electrical types are taken up. The various physical principles employed are explained, and detailed descriptions of all the better-known standard makes are given. The advantages, limitations, applications, sources of errors, and calibration of the various types are ably discussed.

An interesting feature of the book is the amazing variety of applications which are described or at least mentioned. In addition to the conventional use for taking indicator diagrams on reciprocating engines, such applications as the study of powder pressures in guns, turbulent flow of gases in engine cylinders, knock testing, determination of vibrations, and many other uses, are described.

The comprehensive bibliography will be of great value to those who wish to pursue the subject further.

It is greatly to be hoped that an English translation of this excellent work will be made, so that it may become generally available to English-speaking readers. Although this book has only about 25% more pages than the one published by *Instruments*, it probably has twice the number of words (its format being larger) and goes into many more details.

—John A. Dent, *Professor of Mechanical Engineering, University of Pittsburgh.* (2.09)-B-

Härteprüfverfahren. By Erich Franke. Verlag Chemie G.m.b.H., Berlin, 1937. Paper, 7 × 10½ inches, 162 pages. Price 18.75 RM.

Under the able authorship of Dr. Franke there has been published, as a separate volume of 162 pages, a section of Gmelins Handbuch der anorganischen Chemie, entitled, Härteprüfverfahren.

These pages contain in compact form an exceptionally fine review of the work which has been done on hardness testing since the beginning and extending up to April 1937. The book divides itself into four quite distant sections. The first occupies 110 pages and deals with the various methods which have been employed in measuring hardness down to the present day. From page 110 to 130 a great deal of attention is paid to comparisons of hardness numbers as determined by various instruments. From page 130 on to 150 there is given an excellent study of the relations which exist between hardness and many of the physical properties. For instance, the relation between hardness and moduli of elasticity, hardness and tensile strength, hardness and yield strength and other related physical properties. From page 150 on to the end are arranged a series of compilations. Pages 150-154 contains a bird's-eye view of the leading methods for measuring hardness, in which is given a concise statement of the advantages and disadvantages of each system. One is not always in accord with these judgments; nevertheless, they give a consecutive review of what has been described in greater detail on pages 1-110 and these comments give a single viewpoint.

Pages 155-156 list in alphabetical order about 150 different names and methods which have been associated with the art of hardness testing.

Anyone who has worked in the field of hardness testing is always glad to have helps for his bibliography of the subject of hardness. Dr. Franke has added an excellent array of references and has brought a survey of the literature down to April 1937.

This small book of Dr. Franke is a distinct contribution to a field noted for its lack of books concerning hardness. The following list comprises the books published thus far:

F. Ludwik. Die Kegelprobe. Ein neues Verfahren zur Härtebestimmung von Materialien. Julius Springer, Berlin, 1908. (Out of Print).

V. Föschl. Die Härte der festen Körper. Verlag von Theodor Steinkopff, Dresden, 1909. 85 pages.

H. O'Neill. The Hardness of Metals and Its Measurements. Chapman and Hall, Ltd., London, 1934. 292 pages. (See Review, Instruments, Vol. 8, 1935, pages 50-51.)

F. C. Lea. Hardness of Metals. Charles Griffin and Company, Ltd. London, 1936. 141 pages.

Dr. Franke's book is a small volume, which those interested in the subject of hardness and its measurements will desire to add to their library.

—S. R. Williams, *Professor of Physics, Amherst College.* (2.09)-B-

Spectrochemical Abstracts 1933-1937. By F. Twyman. Adam Hilger, Ltd., London, June 1938. Paper, 9½ × 6 inches, 52 pages. Price 4 s.

This 52-page bibliography, with abstracts of more than 1,200 papers on spectrochemical analysis, covers the most important years of the development of the subject. Part I contains a list of references and authors arranged alphabetically under the authors' names. Part II lists substances analyzed and some of the elements determined. The papers are grouped under the headings: Biological Material, Earths, Electrodes, Gases, Industrial Materials, Liquids, Metals and Alloys, Minerals, Non-metals, Apparatus, Methods, and General. A list of the more important books on the subject (1931-1937) is appended. The abstracts are models, showing the salient features of the papers and enabling the reader to judge whether or not he needs to consult the original. This small book of abstracts is capable of showing the beginner nearly all that can be done in spectrochemical analysis and the methods used for emission spectra. Absorption spectra receive slight attention. Every teacher of the subject will wish a copy of this book, and no worker in this field can afford to be without it.

—Kelvin Burns, *Astronomer, Allegheny Observatory, Pittsburgh.* (2.09)-B-

Handbook of the Collections Illustrating Time Measurement. F. A. B. Ward. His Majesty's Stationery Office, London, 1937. Paper, 6 × 9⅜ inches. Part I, Historical Review, 66 pages. Price 1s. 6d. Part II, Descriptive Catalogue, 91 pages. Price 2s.

Part I consists of a brief review of the history of time measurement with notes on the principles used in measuring time. Part II contains detailed descriptions of the objects exhibited in the Time Measurement Section of the Science Museum. Some of the objects in the collection have been photographed and in these cases the identification numbers of the negatives are given. Prints and lantern slides from these negatives may be purchased from the Museum.

Richard Rimbach (2.09)-B-

Trockengleichrichter: Theorie, Aufbau und Anwendung. (Dry Type Rectifiers) By Karl Maria R. Oldenbourg, Munich, 1938. Cloth, 6⅛ × 9½ inches, 311 pages. Price 8.80 RM.

The ever-increasing industrial and commercial applications of dry rectifiers clearly indicate that they are no longer incidental to electrical circuits, but are firmly established as an essential piece of electrical equipment, much in the same manner as the radio tube has found its place in industrial equipment. Up to the present there has been no text book on the subject of dry rectifiers, and the scattered literature al-

though abundant, has been primarily of interest to the physicist rather than the practical engineer. This book fulfills the urgent need for a treatise on the subject, particularly from the engineering standpoint.

The author developed an improved selenium rectifier and, as director of an industrial rectifier laboratory, had occasion to gain first hand information on the numerous problems involved in this new field. Having had more experience with the selenium rectifier, he naturally discusses this more fully than either the cuprous oxide or cupric sulfide rectifier. However, he attempts to present data on all the available types and strives to make the broadest coverage. His vast experience has been reflected in the thorough manner in which he treats the methods of calculation involved in dry rectifier circuits. The rectifier characteristics and methods of assembly are given detailed consideration, although the procedure of manufacture might well have been amplified. A considerable portion of the book is devoted to practical applications illustrated with numerous photographs of equipment and installations. Because of the lack of a sound theoretical explanation of the mechanism of rectification, the author has sketched the numerous proposals suggested to account for this action, and includes a rather extensive bibliography for a more detailed investigation. The mathematics has been reduced to a minimum, and is frequently supplanted by graphical methods. The treatise should serve as a ready reference book to the engineer concerned with the application of dry rectifiers.

—C. C. Hein, *Research Laboratories, Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.* (4)-B-

Actualités Scientifiques et Industrielles. Exposés d'Astronomie Stellaire. Edited by Henri Mineur.

Vol. VI. **Les Parallaxes Dynamiques des Etoiles Doubles.** By M. D. Barrier. Hermann et Cie, Paris, 1936. Paper, $6\frac{1}{2} \times 10$ inches, 32 pages. Price 10f.

This paper gives the derivation of the formulas for computing the parallax of a double star if the orbit is known; or, if sufficient relative motion of the components of the pair has been observed. The nature and magnitude of the errors are discussed, and the relationship between the real and computed statistical parallaxes is found. The paper concludes with a list of all important references to the subject.

Vol. VII. **Théorie de L'Emission de la Lumière des Nébuleuses.** By H. Zanstra. 30 pages. Price 15f.

The author gives formula for the interaction of light, electrons and atoms. He concludes that the assumption of black body radion emitted by early type stars and absorbed by the nebulae is sufficient to explain the emission of lines of H, He I, and the "nebulium" lines. Some other system must be involved in the production of the lines of He II.

Exposés d'Histoire et Philosophie des Sciences. Edited by Abel Rey.

Vol. VI. **L'Oeuvre Astronomique de Gassendi.** By Pierre Humbert. 32 pages. Price 8f.

The active observations of Gassendi covered that interesting and fruitful period which extended from the first astronomical observation of Galileo to the invention of the micrometer (1610-1667). Gassendi became a master of every type of astronomical work that was done in this period, and did much to improve instruments. The astronomical knowledge at the time of his death was based very largely on his observations. But his great contribution to the world of science was his development of the modern scientific method. An ardent and tireless observer, he never discovered anything of note in that age of discovery. But he made the most accurate possible observations of every type of phenomenon. And his feat in being the first to see the planet mercury on the face of the sun is a tribute to his ability. The planet was thought to be much larger than it is, and all but Gassendi missed it. This might well be classed as an important discovery. But the influence on his contemporaries and successors which his genius for method exerted is of far more value than anything he ever discovered.

Kelvin Burns, *Astronomer, Allegheny Observatory, Pittsburgh.* (9)-B-

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The Engine Indicator—Its Design, Theory and Special Applications. By K. J. DeJuhaz. A mine of information for all engineers who have to investigate forces and motions—not only in engines but in many other applications. Cloth, $5\frac{1}{2} \times 8\frac{1}{4}$ inches, 343 pages, $3.75.
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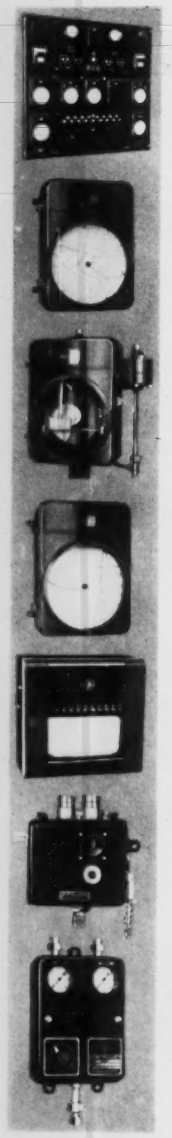

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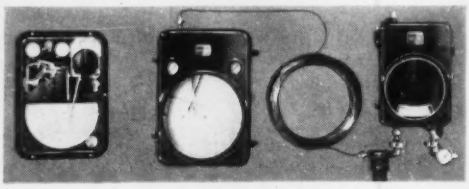

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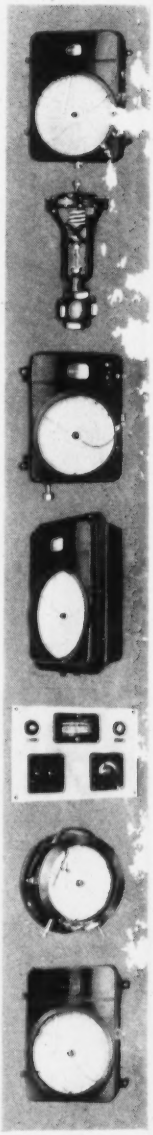

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